THE UNIVERSITY
of EDINBURGH

Re-imagining disengagement from learning: the sociomaterial practices of classrooms and digital game spaces.

Noreen Dunnett

PhD
The University of Edinburgh
2020

Declaration

I declare that this thesis has been composed solely by myself and is my own. It has not been submitted, in whole or in part, in any previous application for a degree or professional qualification.

Acknowledgements

This thesis has been a labour of love over the past six years, involving many people whose contribution has been invaluable.

I owe a huge debt of gratitude to my supervisors, Professor Sian Bayne and Dr Hamish Macleod. Their patience, good humour and immense knowledge in the field of digital education has been a constant source of support and inspiration. Their guidance has enabled me to push myself beyond my self-imposed academic limits to produce a thesis I am truly proud of.

This thesis would not have been possible without the input of the teachers, students and support staff of the schools which form the heart of this thesis. Particular thanks to School E in which I spent hours observing, talking, playing games and enjoying the company of students and staff.

My family have supported me in every way possible. Thanks to my parents who paid my fees during a period when I was unemployed – without this I would have been unable to complete the thesis. Thanks to my children who have put up with my constant moaning, shown interest in my progress, proof-read my thesis and expressed their pride in my achievements. A special thank you to Jake and Joe, my nephews, for playing Minecraft and Clash of Clans with me and talking me through how it all works for them!

Finally, thanks to my husband for his penetrating and insightful questioning about my work during our long walks together, always at moments when I have been the most confused and down-hearted.

Abstract

This thesis challenges the way that disengagement and engagement have been thought about and defined in the formal learning context of schools. Rather than regarding schools as static 'containers' in which learning takes place and engagement as represented in the individual behaviour, achievement and attitude of students, I argue that we should take a sociomaterial approach to understanding disengagement, treating it as performative, as a phenomenon assembled in space and time, through the inter-relations between human and non-human actors such as objects, technology and the environment.

This relational approach enables us to look beyond binary distinctions between in-school and out-of-school practices and incorporate digital gaming as a critical tool to help re-evaluate formal learning environments. By comparing the different modes of existence enacted through the practices of gaming and formal learning I have revealed that by valuing particular performances of engagement over others, schools have stabilised and entrenched practices which increase the likelihood of boredom and disengagement emerging.

In two periods of field work during June/July 2016 and Feb – Nov 2017 in secondary schools in Yorkshire, I used ethnographic methods such as interviews, observations, photographs, video and audio recordings and field notes to generate evidence of students' differing experiences in digital games to create new understandings of engagement and disengagement in the classroom.

The thesis makes an original contribution to scholarship by taking a sociomaterial approach to boredom and engagement, regarding these phenomena as performative and emergent rather than individual cognitive processes. By using engagement in digital gaming practices as a critical tool I have highlighted unhelpful constraints to thinking about educational practice caused by restrictive, culturally normative notions of what

constitutes an engaging and effective student learning experience. Finally I have suggested that rather than aiming for predictability and standardisation in teaching practices teachers should recognise the unique elements and characteristics of each learning situation and develop practices based on their own dynamic judgement rather than in response to policy or the purely instrumental demands of assessment.

This new approach to understanding boredom and disengagement gives educators potential to: use time and space more flexibly and enable more agency for students; recognise a wider range of demonstrations of learning and engagement and work towards less hierarchical relationships between students and teachers, thus intervening in the production of disengagement.

Lay summary

This thesis challenges the way that disengagement and engagement have been thought about and defined in the formal learning context of schools. Traditionally schools have been considered as stable, closed environments where engagement in learning can be measured through the individual behaviour, achievement and attitude of students. I argue that we should approach the study of disengagement, not as a stable, psychological characteristic of individual students but rather as a phenomenon created through the relationships between students, teachers, objects, technology and the environment.

This relational approach enables us to look beyond the usual distinctions between in-school and out-of-school practices to incorporate digital gaming as a critical tool to help re-evaluate formal learning environments. By comparing how engagement emerges differently from gaming and formal learning practices, I have illuminated the ways in which certain practices and ways of valuing engagement have become prevalent and embedded in school practices, increasing the likelihood of boredom and ultimately, disengagement.

In two periods of field work during June/July 2016 and Feb – Nov 2017 in secondary schools in Yorkshire, I used ethnographic methods such as interviews, observations, photographs, video and audio recordings and field notes to generate evidence of students' differing experiences in digital games to create new understandings of engagement and disengagement in the classroom.

The thesis makes an original contribution to scholarship by taking a social and material approach to boredom and engagement rather than regarding it as an individual psychological state. By using engagement in digital gaming practices as a critical tool, I have highlighted limitations in thinking about educational practice and how engaging and effective student learning experiences are created. Finally I have suggested that rather than aiming for predictability and standardisation in teaching practices teachers

should recognise the unique elements and characteristics of each learning situation and develop practices based on their own dynamic judgement rather than in response to policy or the purely practical demands of assessment.

This new approach to boredom and disengagement, which compares formal learning activities to those in informal digital gaming, gives teachers, governors and senior management potential to intervene in the organisation of time and space in schools, to adopt a more flexible view of engagement in learning and provide a wider range of opportunities to demonstrate both engagement and learning.

Contents

TABLE OF FIGURES

LIST OF APPENDICES

LIST OF TABLES

Chapter 1 INTRODUCTION

1.0 Introduction

> Disengagement from learning at school is a serious problem, not only for the visibly disengaged (such has those who drop out from school), but also for 'disengaged achievers' – students who are adept at achieving good grades, but are turned off learning by school...
>
> (Hamlyn Foundation Report, 2012)

In this thesis I set out to challenge the way that the affective experiences of boredom and disengagement tend to be thought about and defined in the formal learning context of schools. Rather than regarding boredom and disengagement as represented in the individual behaviour, achievement and attitude of students (Bergdahl et al., 2020), I propose that we take a sociomaterial approach that regards disengagement and boredom as performative, as phenomena assembled in space and time, through the inter-relations between human and non-human actors such as objects, technology and the environment. As part of such an approach, schools, like universities, are no longer seen as bounded, stable places or static 'containers' (Bayne, Gallagher and Lamb, 2014, p.570-1) in which learning takes place. In this study I take a more relational view of learning spaces and environments (Decuypere and Simons, 2016) which reveals how an emphasis on the importance of predictable educational outcomes (Biesta, 2015) has led to certain practices and ways of valuing engagement becoming stabilised and entrenched in secondary schools in England.

Educational research into games in the classroom suggest that gaming practices may have much potential as a productive contrast with classroom practices (Duncan, 2016, Gee, 2004). The dynamic nature of digital gaming experiences is in direct contrast to schools where, as already described, the

impetus is towards stability and predictability. Unlike the experience of learning, the player has considerable agency over the creation of the gameplay experience which in turn controls the affective atmosphere in which disengagement might be produced. I argue that by comparing digital gaming practices in games such as *Minecraft*, I can re-evaluate formal learning environments and practices which affect student participation and quality of experience in schools in a unique way. Such a re-evaluation acknowledges the presence of different realities and interpretations of practice and aims to encourage teachers to recognise the unique elements and characteristics of each learning situation which produce boredom and lead to disengagement. Developing formal learning practices, which rely not purely on policy or the demands of assessment but on teachers' dynamic judgement of learning situations, has the potential to enable relations between sociomaterial elements to be adjusted to prevent boredom and ensure engagement in learning.

According to Macklem (2015), not only is boredom one of the most commonly experienced emotions of students in schools but it is specifically classroom practices which disengaged students associate with boredom, more than content or subject matter (p.42). Despite this, research into boredom in educational settings still tends to place the emphasis on student attributes and behaviour, advocating greater emphasis on the development of boredom coping skills. By restricting interpretations of boredom and disengagement purely to the attributes of individual students, rather than exploring how the affective experience of learning is created in the classroom, we restrict opportunities for teachers to consider the participation and agency of other factors in the learning process, which in turn, present a greater range of possibilities for intervention.

Digital technology has been seen as one way to establish completely different ways of learning in schools, with the potential to create the sort of sociomaterial conditions which promote student engagement. The ability of digital technology, such as games and social media, to provide links between in-school and out-of-school learning is cited in the Hamlyn

Foundation report (2012) 'The Engaging School', in which OFSTED emphasise the importance and impact of learning outside the classroom and the cognitive benefit for students. Despite this, the emphasis is still on digital technology as a tool (Bergdahl et al., 2020) used by students rather than as an equal participant in the learning experience. Engagement is regarded, therefore, as the emotional reaction of students to the use of such tools, with researchers even concluding that students use technology to *disengage* from learning (ibid). Uniquely however, from the many highly engaging digital activities available, games have already become an established part of educational practice and research. As teachers and academics have recognised, not only are games designed around sound learning principles (Gee, 2004) but gaming practices themselves contribute to engaging experiences (Whitton and Moseley, 2014). Unlike Whitton and Moseley however, I have deliberately chosen not to consider educational games, whose primary focus is learning rather than entertainment. Educational games tend to be designed around an instrumental and interventionist view of games, as vehicles for the achievement of educational goals, (Duncan, 2016) rather than valuable learning experiences in their own right. Duncan (2016) argues that games and learning should be seen as activities which are most engaging when they are personally meaningful, experiential and social, suggesting that we can move research forward by taking on the term 'games with learning' which brings together the interrelations between the design of games and learning practices.

In the next section I explain how my interest in boredom and disengagement in schools developed and what motivated me to compare school and gaming practices. Following that, I give a brief outline of the analytical framework upon which I draw and describe the structure of my thesis.

1.1 Background

Almost half (45 percent) of pupils have become disengaged from school (but not necessarily from education) by the time they sit their GCSEs, according to a Demos report (Wybron and Paget, 2016). Many reasons have been cited for this level of disengagement and boredom, with assessment practices being seen as a potential factor (Harlen and Deakin Crick, 2002; Pring, 2013). It has become widely recognised, even by OFSTED, the government inspection body for schools in England (Spielman, 2018), that the 'standards agenda' which dominates current education policy (Hutchings, 2015; Pring, 2013) is resulting in formulaic and highly standardised learning experiences which are focused on high stakes testing (Arnone et al., 2011; Harlen and Deakin Crick 2002). The concern is that if assessment practices are reducing motivation for learning it will have serious consequences on the '…widely embraced aim of developing students' capacity to learn…into lifelong learning' (Harlen and Deakin Crick 2002, p.1).

As a former teacher, e-learning consultant and educational liaison for a schools' videogame festival I have had the opportunity to observe students learning in a variety of such settings and circumstances, both formal and informal. What has been striking across the various areas of my professional activity has been the link between the affective experience of learning, what I will call 'quality of experience', and levels of engagement in the learning process. Educational practices produced by the testing regime seem to be affecting the quality of the formal learning experience which may be contributing to the growing boredom and disengagement of students (Neumann et al., 2016; Ross, 2009; Wybron and Paget, 2016) in secondary school classrooms.

In contrast I describe an example of the differing affective experience of learning in digital gaming contexts from my own experience as educational liaison and consultant for Games Britannia, a schools' video-game festival. During the festival, a number of workshops were provided by game industry

professionals, particularly on coding and game design development. One of these workshops used challenging mathematical concepts usually associated with advanced level studies in Mathematics during an exercise to teach 11-13-year-olds how to animate a bouncing ball, as can be seen in Figure 1. Not only would this have been an unlikely occurrence in a classroom, where introduction of concepts follows a linear, sequential and predictable pattern, but the inclusion of such a high level of challenge in a learning experience would usually be associated with disengagement.

Figure 1 Coding workshop: Games Britannia 2013

However, because the context of such learning was the development of game mechanics, this did not seem to be the case, as the facilitator and a participant in the session confirm in these quotes from a video interview[1]:

> We did a simple physics workshop where we did Newtonian mechanics… so they wouldn't have known they were doing Newtonian mechanics ...but that is what they were doing.
>
> Lindsay Fallow (Stray), Games Britannia workshop, June 2013

[1] YouTube – Games Britannia 2013 17 12 - Time stamp 2:56 – 3:20
https://www.youtube.com/watch?v=7am3CjrJOr8&t=182s

> We've been making a bouncing ball…it was really hard at first but then once you know how to do it, it's easier.
>
> Student in Lindsay Fallow's workshop, June 2013

The active participation of students in the learning process and the immediate feedback of the 'bouncing ball' appeared to produce high levels of engagement in this challenging learning experience.

The aim of this study is to gain an understanding of how disengagement is produced by comparing gaming experiences such as the one described above and the practices which produce them, with the practices and experiences of students in the classroom. If we are to intervene in disengaging learning situations, we need to tackle our lack of understanding about how productive conditions for learning (and engagement) are established in formal learning contexts and how existing pedagogical practices affect them.

On a practical level, research is needed to understand how educational policy tends to afford or constrain practices and relations between students, teachers and learning environments, practices from which different kinds of engagement emerge, which in turn affects the quality of experience for a student (Thompson and Cook, 2015). The spatial turn (Lefebvre,1991) as it is called, analyses how educational spaces are relationally enacted, which enactments are prevalent and become practices and what form practices take in different settings (Decuypere and Simons, 2016). Specific sorts of time and space and ways of doing things are enacted in different settings. For example, schools control space and time through school rules which govern bodies, movement, talk, space and time. School rules tend towards 'uniformity and standardisation of time, space, materiality and bodies in school' (Jones et al., 2016). Gameplay, on the other hand, may reorganise the experience of time (Hollett and Ehret, 2015) via technical means with embodied activity being experienced in a different affective atmosphere to the classroom. The experience of space in digital gaming is also

fundamentally different to classroom experience. Digital gameplay can be experienced in multiple settings via mobile devices. In practice, however, many games are played in the same physical setting – a bedroom, a living room – where a player has set up a gaming console or PC. Apperley (2010) points out that the 'situation' in which digital games are enacted is a key factor in shaping the experience of play. Through empirical evidence collected in classrooms and from gaming experiences, this study explores the way in which time and space are organised and how differing enactments of engagement affect the student experience.

Sociomaterial approaches encourage us to regard space and time as performative rather than representational. By understanding space as the relations between actors, rather than a physical setting, the concept of time also changes. The linear understanding of time in schools engenders practices which require engagement to be sustained continuously rather than intermittently as the more simultaneous enactment of time in games does, for example. My theory is that these different enactments of forms of space and time may be related to the production and enactment of boredom, leading to disengagement. I suggest that schools are not bound to their current organisation of time and space however,

> With the help of technology and radical reimagining of time and space, then, lessons no longer have to adhere to the 'one size fits all' approach characteristic of the traditional system.
>
> (Hampson, Patton and Shanks, 2013, p.7)

1.2 Boredom and engagement

Boredom and engagement would be regarded by many (Breidenstein 2007; Belton & Priyadharshini, 2007; Macklem, 2015; Shernoff & Csikszentmihalyi, 2009) as opposite ends of a spectrum in terms of human experience. Boredom is defined as 'a complex human emotion' (Belton and Priyadharshini, 2007 p.592), associated with 'lack of activity or being disengaged from a satisfying activity' (Macklem 2015 p.1) and with an 'inability to engage and sustain attention' (Carriere et al., 2008 p.836). Disengagement is the behaviour or action which follows from the negative affective experience of boredom. Characterisations of boredom and engagement as dynamic and as operating on a continuum (Duffy and Elwood, 2013; O'Brien and Toms, 2008) are present in both gaming and education literature. At the other end of the continuum, engagement is also defined in terms of emotions such as curiosity, interest, concentration and enjoyment by both educational and gaming researchers (Arnone et al., 2011; Shernoff & Csikszentmihalyi, 2009), but are seen as 'triggers' to positive affect and behaviour.

It is not altogether surprising, therefore, that findings from educational research about boredom and engagement have much in common with similar research in gaming studies. Boredom tends to be perceived as time passing slowly and negatively affects engagement. At the other end of the spectrum is a concept called 'flow' which is recognised in both gaming and educational research (Shernoff & Csikszentmihalyi 2009; Schoenau-Fog, 2011; Whitton and Moseley, 2014). Flow (Csikszentmihalyi, 1997) is associated with a lack of awareness of time passing or perceptions that time is speeding up. The affective experience of time seems to be central to an understanding of the phenomenon of boredom.

Much of the existing research into student engagement, on the other hand, has focused on higher education and more instrumental understandings of

'engagement' as an indicator of:

> …performance, student experience, quality of education and a guide to influence pedagogy, practice and policy
>
> (Whitton and Moseley, 2014, p.434).

Similarly, schools tend to measure participation and activity or 'engagement' in terms of excellent examination results which assure the school's national ranking in school league tables. The danger with such a focus is that even if contributory factors such as environment, technology, relationships with teachers and pedagogical design are considered and acknowledged, complex phenomena such as boredom and disengagement are reduced to cause and effect, with the only possible intervention being to manipulate individual human behaviour and emotion in order to achieve the desired 'performance'.

Sociomaterial approaches encourage us to see schools as networks rather than bounded, stable places or 'static containers'. This study uses such an approach to enable us to look beyond human behaviour, to ignore the usual distinctions between formal/informal learning and in and out of school practices and to incorporate digital gaming as a critical tool to re-evaluate the experience of learning in the classroom.

My contribution to educational research into disengagement is unique in several ways. The first is that I approach disengagement in secondary schools in England from the perspective that high stakes assessment and standardisation has engendered entrenched and stabilised teaching and learning practices which are designed to deliver predictable outcomes rather than enhance student experiences of learning. Whilst the role of high stakes assessment has been considered by other researchers, suggested solutions have been focused on school and systematic change (Pring 2013). Previous research into engagement has either focused on higher education, or as mentioned in the previous paragraph, tends to regard students as the

focus of any intervention, even whilst acknowledging contributory factors such as environment or pedagogy. Research which takes environmental complexity into consideration, to compare engagement in gaming practices with formal learning practices, tends to look specifically at educational games, developed expressly to achieve formal learning goals. This study has consciously chosen to explore practices in commercial games rather than educational games because they are not designed to satisfy explicit educational goals. As such they can be considered to have characteristics and practices distinct from those of the classroom. They may act as a 'boundary object', encouraging students to make links between their own knowledge and that which they acquire in the classroom, a process which has been associated with greater interest and enjoyment (Bailey, 2017; Dezuanni, Beavis & O'Mara, 2015; Ito et al., 2008). This is explored in depth in Chapter 5.

1.3 Methods and research questions

As already mentioned, my intention at the outset of this research was, firstly, to question the emphasis on high stakes assessment and accountability and the need for predictable outcomes and whether they have produced schooling practices which are leading to students disengaging from formal learning; secondly, to suggest that narrow interpretations of boredom and disengagement, based on representations of student behaviour, attitude and achievement, have restricted educational research and opportunities for intervention; thirdly to propose that framing education as spatial practice, and re-imagining disengagement as performative rather than representational, might allow us to consider differing enactments of boredom and disengagement such as those in digital gaming, enabling us to theorise about relations which may have produced these phenomena and finally that digital gaming practices, already part of formal classroom learning, offer potential to provide a productive contrast with classroom

practices by encouraging teacher to consider how boredom or conversely, engagement, might be produced by the unique elements and characteristics of each learning situation.

On this basis, my research questions ask:

- Is there a connection between high stakes assessment, the need for predictable outcomes and disengagement in classrooms?

- Do interpretations of boredom and disengagement as attributes of the individual student restrict research understandings and opportunities for intervention?

- What is the value of re-framing educational practice as a spatial practice? Does it enable meaningful comparisons with other practices such as digital gaming?

- To what extent does digital gaming offer a productive contrast with classroom practice and the way we understand boredom and disengagement?

In order to address these questions, I chose an ethnographic approach as the most appropriate strategy. Actor Network Theory aligned well with this approach having a similar focus on practices but incorporating an understanding of materiality and encouraging connections between practices and objects (Macleod et al., 2019). Ethnography, therefore, seemed naturally oriented towards a performative view of the phenomenon of disengagement, one in which practices are made visible by following and untangling the many actors that assemble in learning and gaming situations.

As a sociomaterial researcher I became part of the assemblages I was investigating, generating but also configuring empirical evidence of material practices in both the classroom and digital gaming. I collected data

through observation and interview in the form of field notes, transcripts, audio and video recordings and photographs in my field sites. This enabled me to assemble a body of evidence about the enactment of boredom and disengagement. This process is described in detail in Chapter 3.

I conducted my fieldwork in four secondary schools in Yorkshire, a pilot study with three schools in June-July 2016 and a further in-depth case study in School E from February – November 2017. My student participants were drawn from the 11-13-year-old age group (Year 7-9). Research suggests that during this stage of formal schooling the majority of young people are already either engaged or disengaged in learning (Ross, 2009). The implication of this is that disengagement is still an on-going process up to Year 9 of secondary school, making this an optimum period to study enactments or assemblages of engagement. The participants in my study were either members of a lunchtime *Minecraft* Club or students in English Intervention lessons where *Minecraft* was being used as a stimulus for writing. Although I focus heavily on *Minecraft* in this study, I also explore in detail two commercial games which my participants played at home: *Rainbow Six Siege*[2] and *The Turing Test*[3]. These games were selected and played by two of the core participants in the study in an out-of-school setting, the home, and provided a further point of comparison with formal learning practices and with *Minecraft*.

Minecraft is a popular commercial game (126 million players - The Verge, May 2020) particularly with the 7-13-year-old age group. It was chosen as the main focus for comparison with formal learning activities firstly because it was not conceived or developed specifically as an educational game and secondly because despite this, it is widely used in educational settings. These characteristics meant that the *Minecraft* itself retained gaming practices which had not been appropriated or adapted to educational goals.

[2] *Rainbow Six Siege* is a tactical shooter video game with a loose narrative, focusing on recruits going through training to prepare them for future encounters with the White Masks, a terrorist group that threatens the safety of the world. Full description in section 4.
[3] *The Turing Test* is a first-person puzzle video game developed by Bulkhead Interactive.

However, there has been a recognition in educational circles that the affordances of the game were compatible with those educational goals. The game is based on blocks (has been described as online Lego) and involves building and creating structures in different environments and terrains, collecting resources, crafting items and combat. It can be played on a variety of devices with several versions available including an education version called *Minecraft Education Edition*. It should be mentioned that the education edition has merely added some 'teacher tools' to the existing commercial game such as a portfolio tool to enable assessment of in-game activity. *Minecraft* is discussed in more detail in section 3.3.4.1.

My approach to analysis was influenced heavily by Hopwood (2018) and Thomson (2017) who advocate a playful approach to data, encouraging the writing of synoptic units, or extractive summaries about bits of data, in your own words. These synoptic units are used to look for patterns, to juxtapose data so that contradictions and connections become apparent. I also drew on Fenwick and Edwards (2010) and Bhatt and de Roock's (2013) notion of data as a series of empirically observable events. Events are described as '…empirical occasions involving interaction and activities…' (Bhatt & de Roock, 2013, p.4), a concept which seems to fit well with both classroom and gaming activities. Descriptions of data as 'events' encapsulate a performative notion (Bhatt & de Roock, 2013) of boredom and disengagement and enabled me to create a list of key events and to build a rich account of practical and active instances in game play and classrooms.

Underpinning the study is a body of literature on sociomaterial approaches to educational practices, literature relating to the field of engagement and boredom and to the role of assessment and education policy and digital gaming in education which I turn to in Chapter 2.

1.4 Outline of thesis

In this chapter I have outlined the agenda for my thesis and explained the educational background and personal circumstances which led to my interest in boredom and disengagement in secondary schools in England. I have briefly reviewed the existing research in this area and detailed my unique contribution to the field, as well as the value of both the ethnographic sociomaterial approach I am advocating and the comparison with digital gaming.

The remaining chapters are organised as follows:

Chapter 2 reviews the research literature in the fields of boredom and engagement/disengagement and relates this to the research findings on the impact of the current emphasis on high stakes testing in English classrooms. The rationale for using a sociomaterial approach to explore disengagement in secondary schools is provided by reviewing the key research on Actor Network Theory, assemblage theory and the spatial turn in education. I consider the themes which emerge from this body of literature and how the hybrid approach used in this study evolved. The later sections of the chapter discuss existing ethnographic work comparing *Minecraft* and classroom practices and how they have informed my work.

As I have discussed earlier in this chapter, sociomaterial ethnography is a complex endeavour in which the researcher is part of the process. As such, Chapter 3 provides an in-depth narrative around the selection of my study design and methodology and my approach to data collection, providing illustrations and examples of each stage of my field work and analysis.

In Chapters 4 and 5 I consider key questions regarding the value of spatial framings of educational practice by organising my untangling of formal learning assemblages loosely around space and time. I evaluate the contribution of digital gaming as a contrast to classroom practice using

Duncan (2016) framings of gaming in education: 'gaming ***for*** learning', 'gaming ***as*** learning' and 'gaming ***with*** learning'.

In my conclusion I review what has been learnt about the sociomaterial practices of formal schooling and evaluate whether a comparison with digital gaming informs our understanding of how boredom and disengagement emerge in classrooms. Limitations to this study in terms of research sites and researcher role, participants selected and scope of the data collected are discussed. I make recommendations for a variety of practical interventions to classroom practice, particularly around the organisation of time and space, which are designed to prevent boredom and disengagement emerging. Finally, I consider the huge impact which the recent COVID pandemic has had on teaching and learning practices in UK schools and the implications that has for the theoretical framework and methodology I have used in this study.

Chapter 2 LITERATURE REVIEW

2.0 Introduction

This chapter is organised in three main sections. The first section locates this study in relation to wider theoretical perspectives, with a focus on psychological approaches to boredom and disengagement in formal educational settings and argues the merits of my alternative approach - a hybrid version of a sociomaterial approach which offers a way of understanding boredom and disengagement appropriate to this study. I go on to explore literature which establishes the impact and role of current educational policy and practices on disengagement in the classroom and current thinking about gaming in education. In the second section I review the literature around Actor Network Theory, assemblage theory and spatial approaches to educational research, and establish this study alongside other work which takes a sociomaterial approach to learning and engagement in games and classrooms. From this review, I identify a number of emerging themes which have informed my own analysis. In the third section I outline the research that has specifically informed this project, beginning with an overview of classroom-based studies employing an ethnographic approach to engagement and games in the classroom and conclude with a focus on recent, relevant research related to *Minecraft* in educational contexts.

2.1 Framework for Research

2.1.1 Boredom and engagement

Although there is an extensive body of literature in educational research around engagement and disengagement there are few studies of boredom despite its acknowledged prevalence and effect on motivation, learning

and engagement. Much of the research which has been done takes a psychological perspective. Definitions are hard to come by. Macklem (2015) calls boredom an 'academic emotion', which students experience as 'a lack of activity or being disengaged from a satisfying activity' (p.1). Other researchers, such as Belton and Priyadharshini (2007), do not define boredom, simply acknowledging it as a complex phenomenon, experienced through perception of the passage of time.

The affective experience of time and its relation to boredom is a common theme in the literature (Belton and Priyadharshini, 2007; Breidenstein 2007; Macklem 2015). Breidenstein (2007) describes boredom as an experience 'that observes and makes time explicit' (p.104) and leads to individuals detaching themselves from the situation they are in, in essence becoming disengaged. As a psychologist, Macklem (2015) regards perception of time as a function of emotion. She suggests that some individuals have boredom proneness which means that they experience time passing more slowly than others. Children with attention disorders have particular difficulty with processing time and hence are more inclined to be bored. Two of the six core research participants in this study have been diagnosed with such disorders. As I discuss in section 3.3.4.2 participants were selected from a school *Minecraft* Club. The videogame *Minecraft* holds particular attractions for children with Autistic Spectrum Disorder (ASD) and Attention Deficit Hyperactivity Disorder (ADHD. Researchers such as Macklem (2015) and Belton and Priyadharshini (2007) who take a psychological approach to boredom would assume that it can be addressed by individual behaviour modification. The solution to boredom, for both children with attention disorders and children as a whole, would be to teach self-regulation strategies and help children develop boredom coping skills. However, as I discuss later in this study, researchers such as O'Sullivan (2017) suggest that 'twice exceptional learners' (those with ASD and ADHD) benefit from a range of strategies such as the provision of an adaptable environment and the freedom and variety to engage in learning in ways which interest them. As I propose in this study, it is the relations between students with and without

attention disorders, lesson activities and environment which need to be explored as possible ways to intervene in boredom and disengagement.

Although boredom researchers do acknowledge other contributory factors such as pedagogy and classroom practices, boredom does seem to be regarded it as an inevitable part of the learning process (Belton and Priyadharshini, 2007; Breidenstein, 2007; Macklem, 2015). Breidenstein and Belton and Priyadharshini suggest that boredom is a 'legitimate human emotion that can be central to learning and creativity' (Belton & Priyadharshini, p.579) and should therefore be accepted or even welcomed. Boredom in non-educational settings may indeed be a stimulus to creativity and an opportunity for reflection. However, Belton and Priyadharshini's (2007) assumption that there is the time and space in a formal secondary school context for boredom to become a trigger for creativity and learning is not borne out in my findings (Section 4.2). As I discuss in section 2.1.3, the pressure on schools to be accountable and to produce predictable outcomes also militates against practices which would allow the space for boredom to produce creative responses from students.

In summary, all three authors reviewed here regard boredom as primarily a human emotion, even while acknowledging that pedagogy and practices may affect human actors. Breidenstein (2007), for example, questions whether we should regard boredom as purely an inner mental state but suggests it may be a performance which can be explored in terms of its communicative and social function. There are no concrete suggestions from him as to how this might be achieved however, either practically or methodologically. Whilst acknowledging the affective dimension of boredom and its effect on engagement, my study challenges the view that it can be solved by teaching students to manage their emotions or that we should necessarily accept boredom as an inevitable and even positive part of classroom learning.

Studies of engagement are also heavily oriented towards psychological

explanations, both in educational and gaming studies where it is characterised as curiosity, interest, concentration and enjoyment on the part of the individual student (Arnone et al., 2011; Shernoff & Csikszentmihalyi, 2009). Classic conceptualisations of student engagement in formal schooling tend not to focus on the student experience or the learning environment however, instead defining it mainly in terms of what adults would like students to ***do*** to be '*good*' (Shernoff, 2013, p.47) or '*proper*' (Biesta, 2015, p.32) students. In other words, they tend to foreground individual student behaviour and attitudes, concentrating on engagement through representation, similarly to Breidenstein's (2007) discussion of boredom. Disengagement, by implication, is interpreted as the absence of, or non-compliance with the culturally specific, desirable behaviours described above. Many of the studies which are based on an intervention of some kind rely on the assumption that they are targeting a distinct and specific group of students labelled 'disengaged'. Finn and Zimmer (2012) define the situation thus:

> Disengaged students are those who do not participate actively in **class and school** [my emphasis] activities, do not become cognitively involved in learning, do not fully develop or maintain a sense of **school** [my emphasis] belonging, and/or exhibit inappropriate or counterproductive behavior. (p.5)

Even if we accept the principle that there is such a group of students, there is often little evidence to support the claim that interventions such as increased vocational opportunities can help to improve their levels of engagement (Ross et al., 2009). Duffy and Elwood (2013) quote Fuller and Unwin (2011) who say: 'vocational education might restrict young people's horizons at too early an age' *(*p.202). Similarly, aiming changes in learning and teaching practices or special curricular provision ***solely*** towards disengaged students would seem a limited and pointless exercise if engagement and disengagement are a continuum, as I discuss below.

Some authors such as Duffy and Elwood (2013) recognise that

'disengagement is a more fluid and dynamic concept' (p.112) than educational institutions might think, and is not a 'static indicator, nor a fixed state of being' (p.113). Duffy and Elwood argue, similarly to Bryson and Hand (2007), that we should see engagement/disengagement as a continuum, which is specific to institution, local context and activity (Gourlay 2017) and operates on several levels, from a learning activity to an entire programme of study.

Similarly, in the university sector, Gourlay (2015) discusses engagement, not in terms of the student experience per se but as a '… desirable set of practices and orientations in students...' (p.1), again focusing on student behaviours. However, whilst schools desire students who produce excellent examination results and assure the school's national ranking in school league tables, the university sector puts more emphasis on engagement by participation in process, activity and interaction (Gourlay, 2017).

Engagement in school is driven largely by institutional accountabilities such as achievement and retention. It is these accountabilities which determine the definitions of engagement used in much of the literature. As Shernoff (2013) infers, this may not be a satisfactory or useful way to conceptualise engagement in learning, leading to an over-emphasis on the behavioural and psychological aspects of engagement, aspects which are more easily tracked and measured. A significant body of research in this area does focus specifically on the measurement and tracking of engagement (Fredricks and McColskey, 2012; Ross, 2009; Willms, 2003; Wybron and Paget, 2016).

Reschly and Christenson (2012) point out there is little consensus about engagement amongst researchers. Whatever their explanation or focus, whether it be on behaviour, emotions or academic achievement, they all end up by concluding there are many factors influencing it but rather than confront this 'messiness' they continue to try to 'isolate' a group or an explanation as the 'answer'. This lack of consensus and the acknowledged complexity of the issue suggests that it may be fruitful to move the focus

away from the behaviour or characteristics of the human subject (students) in the search for explanations of such a widespread phenomenon as disengagement. Approaches, such as a sociomaterial one, may reveal alternative explanations and suggest other ways of addressing disengagement in our schools.

Gourlay (2017) recognises that distinct ideologies lie behind these differing notions of engagement. My study shares the perspectives of Biesta (2015), Gourlay (2017) and Shernoff (2013) and takes issue with these restrictive, culturally specific and normative notions of what constitutes 'desirable' student practice in universities and schools. In the next section 2.1.2, some of the possible reasons for these cultural and normative notions of engagement are explored in relation to the growing levels of boredom and disengagement in English secondary schools.

2.1.2 Education policy and the 'standards agenda'

> Learning is narrowed and impoverished by the all-pervasive system of testing… Assessment is killing education. (Pring 2013, p.3)

There is a sizeable body of literature which argues that the current 'standards agenda'[4] in UK education, with its heavy emphasis on testing (Biesta, 2015:19; Pring, 2013; Hutchings, 2015) and an increasingly narrow curriculum, is responsible for large scale disengagement from learning (Otrel Cass et al., 2016; Wybron and Paget, 2009) and for school cultures which are dominated by didactic teaching methods, print-based practices and hierarchically organised forms of knowledge (Merchant 2009, p117) transferred to individual learners. Indeed, Biesta (2015) states

[4] Standards agenda - 'the standards agenda', an approach to educational reforms which seeks to 'drive up' standards of attainment, including workforce skill levels and ultimately national competitiveness in a globalized economy' Ainscow et al. (2006)

> …an idea still prevalent in our times… is the idea of education as a process of transmission. (p.27)

Pring (2013) suggests that the narrowing of the curriculum has arrived through a disproportionate focus on English and Mathematics, subjects for which schools are held directly accountable, which, in turn, has led to subjects such as music, drama and art, which may have supported educational aims such as creativity, collaboration and independent learning (Hutchings 2015; Pring 2013), being demoted or even removed from the school curriculum.

There has been, and continues to be, much debate about the purpose of education and about the sort of curriculum which should provide it. Most philosophical approaches concerning the curriculum revolve around ideas about knowledge and what is worthwhile and valuable, both to the individual and to society (Bailey,1984 in Marple 2010). Other research into curriculum delivery and learning reminds us that ***how*** children learn is as important as ***what*** they learn. Alexander (2009), for example, calls for a curriculum which enlivens children's 'amazement, perplexity, curiosity, discovery, invention, speculation, fantasy, play and linguistic agility' (p. 257) urging that schooling should not stop short at 'transmission and recall'.

Bernstein (2004) approaches education through the lens of pedagogic practices, which order knowledge in particular ways, either to be dependent on market forces or upon the 'assumed autonomy of knowledge' (p.196). He defines two types of generic pedagogical practices he has identified which order the transmission of knowledge: visible and invisible pedagogy. Visible pedagogical practices have an explicit regulative and discursive order and emphasise the performance of the student and the ability of the texts they create to satisfy criteria whereas invisible pedagogy has implicit regulative and discursive rules and emphasises acquisition and competence. Bernstein (2004) points out that

> The explicit rules of selection, sequence, pace, and criteria of a visible pedagogy readily translate into performance indicators of schools' staff and pupils, and a behaviourist theory of instruction readily realizes programmes, manuals, and packaged instruction. (p.213)

Marples (2010) takes a broader view, considering three possible aims for education – education for work, education for knowledge and education for well-being. Whilst Bernstein focused on the impact of instrumental approaches to education on students from different class backgrounds, Marples' wider perspective is that such approaches may well deprive all individuals of opportunities for fulfilment and personal development and tend to lead to didactic teaching methods producing classroom practices which are increasingly uniform and lacking variety in terms of activities and lesson structures, with an over-emphasis on target-setting, time-consuming written feedback and interventions and booster classes (Hutchings, 2015).

As Mulcahy (2015) puts it:

> Politics plays out in material practice. (p.590)

This emphasis, in turn, affects the quality of the student experience, resulting in resentment, boredom and a decrease in student engagement and motivation. Biesta (2015) argues that the present emphasis on assessment and measurable outcomes has been excessive because it relies too much on a technological view of education. Technological views of education regard education as a closed system, seeing it in terms of a cause-effect relationship, where input and outcomes are directly related. The advantages of this view are that education becomes more predictable but the danger for educational research is that it cuts down the ways that researchers can think and explore educational practice.

This study, by taking a sociomaterial approach to boredom and disengagement, could be argued to make little practical contribution reducing boredom in secondary schools. By focusing on the instability of definitions of boredom and disengagement and of the practices which

produce them, solutions which could be implemented globally in the school system are not possible. However, I would argue that my approach, by comparing practices which produce engagement or disengagement in both gaming and classroom, does offer educators new ways to consider what is happening when students are bored and disengaged from formal learning. New practices should become a matter of judgement on the teacher's part, rather than policy. I would go further and argue that predictability and standardisation in teaching practices may not be a desirable aim, an issue that is picked up in section 2.1.4. Each learning situation has unique elements and characteristics which a sociomaterial approach is able to account for by acknowledging the presence of different realities and interpretations.

In the next section I return to Biesta's (2015) view that the present emphasis on assessment and measurable outcomes is excessive and too reliant on the concept of cause and effect, which, I suggest, may be having a detrimental effect on practice and student experience of learning. I consider the literature around assessment and accountability and how it may be related to boredom and disengagement.

2.1.3 The role of assessment

In the last 10 years a body of literature has sprung up around the potentially negative effects of an educational agenda which centres on globally comparable standards (Project for International Student Assessment (PISA)) and the assessment mechanisms necessary to make this possible. Pring (2013) suggests that policies arising from this 'standards agenda' are driving an assessment regime which may be the root of the curriculum's current problems, both with regard to education practices and to disengagement.

Torrance (2017) reminds us that the role of high stakes assessment, such as

external examinations at GCSE and 'A' Level, in English schools has changed over the last 30-40 years. It started as a process for selecting small numbers of students for 'elite education' (p.3) and became a large-scale system of accountability for schools and teachers and a method of standardising education to ensure that the socio-economic needs of the country are met. Mansell, James et al., (2009) suggest that the uses to which assessment is being putting is now too wide. Although low stakes assessment or formative assessment can be a valuable tool for promoting future learning, giving feedback to students and their parents about their learning and helping their understanding and achievement, schools are under increasing pressure to use formative assessment to predict future outcomes and lower the risk of a poor inspection or poor league table rankings (Page, 2017). Formative assessment has, therefore, also become heavily influenced by external assessment criteria. Student feedback is largely concerned with how these criteria can be met (Torrance, 2017), a theme which is picked up in my analysis of the role of reflection in section 4.3.3.

In their study of the material culture of the classroom, Jewitt and Jones (2005) note the impact of policy on the time and space of the classroom, pointing out that relations between teachers, students, classroom environments and activities are all shaped by the imperative to meet assessment demands. Even the physical environment, in the form of classroom displays, have become part of this imperative and serve to mediate to students the demands of the GCSE exam:

> …texts on display originated from or related to policy texts, most often the National Curriculum for English. These were prominently positioned on the classroom walls… genres of writing, deadlines, types of exam, and the criteria that should be met to attain particular grades.
>
> (Jewitt and Jones, 2005 p.11)

This was observed in the schools featured in my own research, as indicated in

Figure 2 where the writing criteria for Key Stage 3 (KS3)[5] are displayed either side of the clock in this image, as constant reminders to students when producing any writing for assessment.

Figure 2 English Classroom: writing criteria alongside clock

The relentless focus on accountability, in the form of examination results - monitored by OFSTED - has led to near constant surveillance (Page, 2017) of schools and teachers which, it could be argued, has made 'real' teaching redundant. Both Page (2017) and Hutchings (2015) cite evidence that accountability and the associated risks have become the driving force for schools. The need to develop a means of prediction, to avoid and eliminate such risk, has led to what Page (2017) calls a 'simulation' of education practice and for education to become closer to the closed system Biesta (2015) describes as part of a technological view of education.

The requirement to be 'OFSTED-ready' at ***all*** times, not just once every five years, has led to increasing standardisation in terms of the curriculum and teaching and learning practices (Hutchings, 2015). Standardised lesson plans and schemes of work, normalised patterns of marking and feedback and 'a whole host of models and codes intended to produce teaching in

[5] Key Stage 3 (KS3) is the part of the National Curriculum taught to children between the ages of 11 and 14 in the first 3 years of secondary school. It sets out the subject areas covered and also how pupils are tested and the standard they should achieve.

advance' (Page, 2017 p.10) have become widespread and are discussed in detail in Chapter 4 of this study.

The practices of new teachers are also being shaped and constrained by the frameworks of Teachers' Standards and The Office for Standards in Education, Children's Services and Skills (OFSTED). Indeed, Amanda Spielman, the Chief Inspector for Schools, recognised the potentially detrimental effect of previous OFSTED inspections on the school curriculum and students' experience of learning. OFSTED introduced a new judgement for 'quality of education' in May 2019, which replaced the previous 'outcomes for pupils' and 'teaching, learning and assessment' judgements (Spielman, 2018). However, 'quality of education' is still seen as a process of transmission, the ability to transfer a body of knowledge successfully to a group of individuals (Biesta, 2016 p.27), in a way which can be measured, with no reference to the quality of the learning experience for the individual student. Indeed Macklem (2015) states that research conducted into the impact of high stakes testing suggests that it leads to the curricula narrowing, lessons becoming more teacher-led and learning activities less varied which in turn may be contributing to school boredom and demotivation of students (Mansell and James, 2009).

*T*he latest Education Inspection Framework and the School Inspection Handbook (2019) lay out the criteria for evaluating 'quality of education' which emphasises 'knowledge and cultural capital' and 'appreciation of human creativity' rather than development of creativity:

> Our understanding of 'knowledge and cultural capital' is derived from the following wording in the national curriculum: 'It is the essential knowledge that pupils need to be educated citizens, introducing them to the best that has been thought and said and helping to engender an appreciation of human creativity and achievement.
>
> (School Inspection Handbook, May 2019, p.43)

Indeed, the focus for student experience in the classroom seems to be heavily oriented to memorising information, with The Inspection Handbook (May 2019) mentioning the term 'long term memory' three times in close succession, along with the assertion that

> If nothing has altered in long-term memory, nothing has been learned.
>
> (School Inspection Handbook, May 2019 p.45)

Nevertheless, Spielman at least acknowledges "…that inspecting the 'how' as well as the 'what' of the curriculum will be important in the new framework" *(n.p),* and the Education Inspection Framework (2019) contains this advice regarding the impact of 'quality of education':

> …the curriculum extends beyond the academic, technical or vocational. It provides for learners' broader development, enabling them to develop and discover their interests and talents" (p.11)

In the wider educational community discussion about quality of education, teaching and learning practices and engagement (OECD, 2018) has started to move towards an exploration of young people's informal learning practices and out-of-school culture which are often mediated by digital technology and social media, in very different ways to the use of digital technology in schools.

> After all, education-based social networking can better position students to connect formal and informal learning and give them the opportunity to adapt social media to their lifelong learning kit.
>
> (OECD, 2018 p.82)

Pedro (2012) reminds us that the incentive for those in formal education contexts to take an interest in students' home interaction with digital technology, particularly the Internet, is that it '… influence(s) what young people are able and willing to learn in school'. (p.161). Arnone et al., (2011)

also advocate studying out-of-school learning contexts such as digital gaming in order to understand and address the lack of motivation and engagement in formal learning.

In summary, boredom and engagement/disengagement in formal learning need to be seen in the context of the school system in England[6]. Research suggests that the current emphasis on standards and high stakes assessment is having an impact on teaching and learning practices in the classroom and as a consequence, on the learning experience for students. Technological views of education such as that outlined by Biesta (2015), which see education in a cause-effect relationship may have the advantage of making it more predictable but also limit thinking about educational practice and result in restrictive, culturally normative notions of what constitutes an engaging and effective student learning experience.

2.1.4 Classroom as container

As I outlined in the previous section, recent research suggests that heavy stress on accountability and standardisation has resulted in uniformity of practice and a lack of space for creativity (Hutchings, 2015 p.3-5). By taking a more relational approach in this study I hope to reveal and challenge the ways in which such uniformity has become stabilised and entrenched. Key to such an approach is to move away from the dominant discourse of 'classroom-as-container' (Leander et al., 2010) which makes distinctions between in-school and out-of-school practices and which shape educational research. Instead, within the construct of a learning network, a concept drawn from Actor Network Theory (ANT), binaries such as this cease to have meaning and as Leander et al., (2010) advocate, begin to appreciate engagement '…as ongoing forms of affective energy rather than merely a gateway to learning' (p. 341). ANT provides new ways to

[6] To varying degrees, Scotland, Northern Ireland and Wales have taken different approaches from England with regard to the organisation of schools and external assessment https://www.ft.com/content/f6ae0b84-adf6-11e3-bc07-00144feab7de

frame educational issues such as boredom and engagement and new points of intervention (discussed in detail in section 2.2.2).

Such a point of intervention is discussed by Hampson, Patton and Shanks (2013, p.13) note the huge potential offered by digital technology for breaking out of this container-like view of education, increasing student engagement in learning both inside and outside school. They see integrating digital technology as a powerful way to increase standards of written work and allow reflective forms of assessment. Although support for this view is widespread (Carroll, 2016; Greenhow and Lewin, 2016; Lane, 2018; Pedro, 2012) there are also several acknowledged issues with the incorporation of digital technology into the formal curriculum.

The use of digital technology and the notion of digital literacy, certainly at secondary school level, is often at odds with the 'knowledge-based curriculum' (Marples, 2010) which tends to dominate teaching and learning practice in the current educational climate. Alexander (2009), for example, whilst acknowledging the role of ICT in literacy, devotes a significant amount of attention to concerns from parents and government about the addictive nature of technology. He gives little consideration to the ways in which digital technology might contribute to engagement or to teaching and learning practices in the classroom. Margaryan and Littlejohn (2011) suggest that differences in the learning processes involved in classroom settings and social situations are often based around different models of learning and of student engagement. Both the OECD (2012) report and more recently OECD (2018) argue that one of the most pressing challenges for schools and teachers are

> …how to progressively integrate the new digital media and the resulting innovative social practices into the daily experience of schooling.
>
> (OECD, Pedro, 2012 p.167).

Surprisingly, despite the growing trend towards personalised and self-

supported learning characterised by MOOCs[7], Self-Organised Learning Environments[8] (Mitra, 2006) and YouTube phenomena such as Khan Academy[9], some research (Margaryan and Littlejohn 2011; Rajala et al., 2016) has found that students themselves can become uncomfortable with conventional academic practices being disrupted, both in school and university. Ellison, Evans and Pike (2016) cite the example of a student who refused to engage with the use of the *Minecraft* game in the classroom, preferring the use of a textbook. They advise teachers to explain to students disengaged by digital game-based learning that learning is '…not linear or static, but fluid and experiential' (p.35). Crook (2012) and Sanchez, Cortijo and Javed (2014) argue that despite Web 2.0 tools and social media such as Facebook being available to undergraduate students they are not enthusiastic about using them, fail to see the relevance of these technologies to their formal learning (Margaryan and Littlejohn 2011) and want a conscious separation between social and academic spheres (Smith, 2016). Crook's explanation for student reluctance to incorporate Web 2.0 tools is that the context shapes the practices in relation to a new technology. He gives the examples of collaboration, where school-based tasks are competitive and individualised due to the assessment regimes they are located within and internet filtering and blocking in schools which change the nature of electronic searching.

These examples are echoed in Greenhow and Lewin's (2016) study of social media use in schools. Greenfield and Lewin (2016) discuss the ability of technology to 'disrupt the boundaries between sites where learning takes place.' (p.13), whilst advocating a constructivist/connectivist lens, of learning as situated in contexts of 'circumstances, activity or culture' (p.8). They suggest that in order to '*bridge*' the boundary between formal and informal

[7] MOOCs - online courses designed for large numbers of participants, that can be accessed by anyone anywhere as long as they have an internet connection, are open to everyone without entry qualifications, and offer a full/complete course experience online for free

[8] SOLE - A Self Organized Learning Environment is a program designed to support self-directed education. The term was coined by Sugata Mitra in 1999.

[9] Khan Academy - Khan Academy is a non-profit educational which produces short lessons in the form of YouTube videos. Its website also includes supplementary practice exercises and materials for educators.

contexts we might use a model that theorizes social media as a space for learning, a 'third space' (Philo 2005; Pahl and Rowsell 2005). Indeed Shields (2013) topological approach discusses the role of what he calls 'boundary' or 'liminal' objects, such as the digital game *Minecraft* in this study. In such an approach rather than regarding learning and engagement as phenomena occurring in the container of the classroom, we would regard them as products or effects of a network. Boundary objects, such as *Minecraft* would become different things to different groups of people, whilst remaining recognisable across different environments such as *Minecraft* Club, home and English lessons (5.1.1). Boundary objects provide a 'sense of continuity and cohesion' and encourage students to engage in learning where they are empowered and can make connections between what they know themselves and what they are being explicitly taught in the classroom.

Ironically, a discourse which includes such terms as 'boundaries' and 'appropriation' (Crook, 2012; Greenhow and Lewin, 2016) and 'integration' (Pedro 2012) refer back to a 'container-like' view of learning (Fenwick, 2011). When digital gaming is regarded as culturally 'other', it makes appropriation or integration into formal learning practices necessary (Dezuanni, 2015). The view of the classroom as 'container' is also identified and problematised by Smyth, McInerney and Fish (2013) who draw attention to

> …the continual pedagogical tension (which) exists around the 'in school' and 'out of school' boundaries or borders. (p.301)

Although their study focuses on young people who have disconnected from school rather than specifically disengaging from learning activities, they make the very pertinent point that young people's lives outside of school are highly mobile, in contrast to the classroom. In a sociomaterial approach, for which I will argue in the next section, the focus becomes less the classroom or digital game as 'container' but rather an assemblage of objects, relationships and activities which may all contribute to engagement or disengagement emerging.

Both Greenhow and Lewin (2016) and Crook (2012) provide examples which emphasise this view of clashing or differing learning cultures and practices. The literature also suggests that when technologies are 'appropriated' by teachers, they are often used to replicate traditional approaches (Burnett, 2013; Lynch, 2017; Merchant, 2010; OECD, 2018;) and are then at odds with the creative practices usually seen in more participatory digital cultures. Leander (2007) suggests that integrating online or digital practices into traditional school processes are a spatial and temporal issue rather than an issue of technology integration in any case. As Bernstein (2003) asserts, space-time in schools involves sequential activity, rather than the simultaneous activity which is the norm in online spaces. Kupiainen's (2013) study of school spaces, for example, noted that the key differences between official school practices and more community and out-of-school practices was the different space-time structure which enabled students to work on and learn about things over longer time periods and the ability to work simultaneously on several tasks with different people. What they gained from these arrangements were the ability to access peer-to-peer learning and apprenticeship. Another important point that Kupiainen makes is that adults such as the teacher are valued participants in this process, an idea I will return to in a later section.

2.1.5 Summary

In this section I have reviewed research into boredom and engagement and concluded that such work focuses too much on individual behaviour and internal psychological states which is hampering ability to critique and revise educational practices and intervene in boredom and disengagement.

There is an over-emphasis in education with measuring and quantifying based on a view that there is a cause-effect, linear relationship between education policy and educational practice (Biesta 2015) which I intend to

challenge.

Existing research on boredom and disengagement in formal education seems reluctant to learn from the practices in out-of-school contexts such as digital gaming or social media, thereby creating an unnecessary binary which the sociomaterial approach I take in this study tends to avoid. In the next section I outline Actor Network Theory and assemblage theory and the reasons for choosing this approach to understanding boredom and disengagement.

2.2 Sociomateriality: re-imagining disengagement

2.2.1 Actor Network and assemblage theory

In this study Actor Network Theory (ANT) is regarded as a new way to frame educational problems, providing new entry points for interventions in emerging phenomena such as disengagement and boredom. The value of drawing on ANT is that it allows a detailed analysis of specific educational practices, conceptualizing those practices as 'heterogeneous and spontaneous gatherings of natural, technological, human and non-human actors.' (Macleod et al., 2020). Disengagement and boredom are regarded as phenomena which emerge from continuously changing assemblages.

Marcus and Saka (2006) define assemblage as

> '… a conceptual resource… to do with the imaginaries for the shifting relations and emergent conditions of spatially distributed objects of study…' (p.106)

The term 'assemblage' is often adopted by researchers (Dant, 2004, Giddings, 2006) from Actor Network Theory to describe a network of heterogeneous elements, both human and non-human and the interrelations between those elements. Gourlay (2018) suggested that taking

the 'assemblage' as the unit of analysis rather than the individual student would enable us to understand how successful practice emerges through the participation of people and things.

Sociomaterial approaches such as Actor Network Theory (ANT) and assemblage theory challenge ideas about learning as a process occurring in individual minds, instead seeing phenomena such as boredom and disengagement as a 'network effect' (Fenwick, Edwards and Sawchuk, 2015). Müller & Schurr (2016) argue that Actor Network Theory provides a spatial account of 'how relations in an assemblage are drawn together and stabilised' (p.218). Spatial theory in educational research frames education as spatial practice rather than taking place in any particular context, such as school. The spatial metaphor moves away from container-like notions of the classroom, for example, as a 'bounded context' (Fenwick, Edwards and Sawchuk, 2015, p.83). Instead, we can see learning as part of relational networks embedded in different social practices in different contexts such as classrooms, gaming environments and home (Zurcher, 2015).

The concept of relational networks has allowed me to compare the spatial practices of classrooms and digital gaming, the emergence of differing enactments of boredom and disengagement and to theorise about the relations which may have produced these phenomena. I discuss particular aspects of ANT which are drawn on in this study in more detail in Section 2.2.2

2.2.2 Network metaphors

As mentioned earlier, the network metaphor in Actor Network Theory describes an assemblage of materials of different kinds: human, nonhuman, technical and social with network effects determined by the intensity of a relation between actors. The network is defined by the interrelations between teachers, students, technology and social considerations. An

example of such a network is Leander and Lovvorn's (2006) study of school and online gaming practices which offers the construct of a literacy network for overcoming distinctions based on setting or context such as in-school or out-of-school, a re-conception of literacy and its space-time relations.

In this study, rather than a literacy network, I propose that Mulcahy's (2012) concept of 'affective assemblage' (based on Deleuze and Guattari) might help us find new ways of conceiving of engagement and its relations in space-time. Instead of regarding boredom and disengagement as static states of affairs contained within individual psychological dispositions, I argue that we should see them as an ongoing process co-constituted in the relations between persons, tools and learning environments and technology. Although ANT does not discuss 'affect', assemblage theory suggests that affect might be described as the common goals which result in attraction between objects within the network such as interactive whiteboards, the timetable, the curriculum. These goals might include the current emphasis on the efficacy of direct instruction (Gibb, 2017; Ward, 2018); good behaviour (OFSTED, 2014) and high stakes assessment (Gibb, 2017; Lehain, 2017). Although these goals may change with the political and educational climate, if objects such as the timetable and the curriculum continue to participate, the network tends to remain stable. The stability of the network relies on 'powerful and entrenched assemblages' (Latour, 2005), certain sociomaterial practices become prevalent, and develop strong associations with the performance of disengagement such as lack of attention or focus on the teacher as the primary source of knowledge, for example. Within the ANT network pattern of relations each component does its job and stays in place. Components which are 'hostile' to the network are disassociated or transformed in order to be associated with the goals of the network. For example, spatial and temporal differences with information technologies such as the Internet make integration into schooling problematic, as mentioned earlier (Leander, 2007). By relying on the concept of affective assemblage in this study, I challenge this idea of stable networks and entrenched assemblages, seeing phenomena such as disengagement and

boredom as mobile and emergent.

Mol and Law (1994) supplemented the idea of the network, which has what Fenwick and Edwards (2010) call the potential for linearity and 'enclosed pipelines', with the metaphor of fluid spaces and regions. Unlike network space, regional space is performed in a way that makes what is in it homogeneous. According to Sørensen (2009), regions take the shape of a container or field which is defined by the people and objects within it – content and field mutually define each other, and these regions have boundaries. Inhabitants of that region, for example teachers, students, chairs, the interactive white board, have the same regional identity which may result in what Sørensen (2009) calls 'black boxing'. Black boxing stabilises practices and ways of participating in learning such as the ability of a whiteboard to fixate the gaze of students, with the lack of such a gaze emerging as a form of disengagement. It also discourages scrutiny and review because these stable practices begin to appear 'natural' and not open to intervention or innovation. This was a particular concern for my study – classroom practices developed around current education policy and assessment are difficult to challenge because they are mutually defining. I discuss this in detail in sections 2.1.2 and 2.1.3.

In fluid space interrelations between elements are 'incomplete and shifting', with actors being able to move in and out of the network, single components can be missed, relations being made and cut without the whole network being disrupted. Fluid space is no 'better' than network or regional space – elements inform each other but the way they do this may 'continuously alter' (Mol and Law, 1994, p.664). The fluid metaphor also moves ANT closer to the 'fuzzy' or 'messy' nature of entanglement in assemblage thinking (Müller & Schurr, 2016), a metaphor which, I argue, reflects the reality of sociomaterial practices in both games and classrooms.

I propose a different approach for thinking about boredom and disengagement, which I hope, will help teachers to understand and

intervene in classroom practices, altering the affective experience of learning. As a consequence, my focus is on the nature of participation within network assemblages. Of particular interest to me is Sørensen 's (2009) use of fluid and region metaphors to understand presence, the spatial arrangement of social and material entities through which certain ways of participating are made available. Whilst regional spaces are characterised by tendencies towards patterns of stable practices, fluid spaces are the opposite. Elements are constantly re-forming, participation is variable, there are multiple performances of a technology, as I refer to in my earlier discussion of 'boundary objects' (Shields, 2013).

An example of such multiple performances might be the current practices surrounding use of Interactive WhiteBoards (IWB)[10] in many primary classrooms. These practices are much more flexible than in a secondary school classroom. Rather than being placed at the front of the classroom, within the regional space which Sørensen (2009) calls 'teacher's home' (p.146), Interactive Whiteboards in primary school spaces are often mounted on a side wall or on wheels so that they can be used in different areas of the classroom and are placed at a height that a child can reach enabling interaction with both students and teachers. The reduced visibility of the board also means that its use can be optional, with lessons able to continue without its presence. By implication, this flexibility would make it possible for multiple performances of engagement, lessening the chances of 'entrenched assemblages' of disengagement occurring in such spaces.

In this section I have summarised thinking about Actor Network Theory and assemblage theory in relation to educational practices and how they might produce disengagement. Rather than emphasising human agency, these theories see individuals as part of networks or assemblages within which both human and non-human have equal amounts of agency. By taking this into account, research into educational practices can consider phenomena

[10] Interactive whiteboard - An interactive whiteboard is an instructional tool that allows computer images to be displayed onto a board using a digital projector.

such as boredom and disengagement as effects of the network, produced by relations between persons, tools, learning environments and technology.

I have reviewed research such as Mol and Law (1994) and Sørensen (2009 who use network metaphors to describe these relations. Metaphors such as network, region and fluid spaces describe how elements within an assemblage behave and relate to each other. They help to break down the 'black box' of the classroom and allow me to explore how practices and ways of participating have been stabilised in comparison to gaming practices. They also allow consideration of how education policy and assessment might act on the classroom assemblage.

In the next section I explore some of the themes which emerge when these concepts are used to examine educational practice, such as participation, material cultures, time and space.

2.2.3 Emerging themes

2.2.3.1 Affect and participation

In ANT's topological view of space, network effects are determined by the intensity of a relation between actors, although unlike assemblage theory, ANT is not concerned explicitly with the capacity of objects and humans 'to affect and be affected' (Muller and Schurr, 2015, p.226). Research into boredom in education suggests that the ability to affect and be affected is crucial in this area. Boredom has been described as '…an unpleasant, transient affective state…', and an 'academic emotion' (Macklem, 2015)

The role of affect in sociomaterial relations is central to assemblage thinking (Müller and Schurr 2016). Mulcahy (2012) argues that by shifting our focus from affect as an inner psychological state of human beings to affect as

embodied practices of assembly, both human and non-human, we can explore how affect effects changes in pedagogical relationships, the sort of changes which might produce, for example, engagement or disengagement in learning. We can explore 'how materials participate in pedagogic practice and what is performed through this participation' (p.9). Mulcahy uses the concept of an 'affective assemblage' to discuss how learning 'events' or activities come together in terms of students' impetus to learn, although ANT itself is not concerned with events.

Some researchers in the field of engagement and digital gaming use the term 'affect' differently to assemblage theory, to signify an emotional reaction or stimulus. Veale (2015) however, explores 'affect' as the active investment of game players in an experience and in seeing themselves as agents in the games they play. Their continuing engagement and the quality of the game experience hinges on this agency – they are more likely to accept restrictions or constraints if affectively committed to game play.

In my study I have used the term 'affect' to encompass both the ability to affect and be affected and to indicate an emotional reaction or stimulus on the part of human participants in an assemblage. In particular, the concept of the 'affective assemblage' and 'event' enabled me to group my data in useful ways, enabling a close look at the relations from which boredom, disengagement or engagement have emerged. The theme of affective engagement or the affective assemblage also emerges from existing work in the area of school and classroom practices as I discuss in my final section.

2.2.3.2 Network effects – boredom, participation and agency

> …boredom is… one of the most important problems of participation in school lessons.
>
> (Breidenstein, 2007)

To understand how both engagement and disengagement are assembled through the network we need to regard them an effect of the network – for example, as emerging from the tangle of the timetable, the curriculum, the seating plan and other entities within it.

In much of the literature surrounding engagement, participation has come to stand for engagement. Gourlay (2015), for example, calls 'participation' the reification of 'engagement', using the terms almost interchangeably to describe what she calls the 'desirable' or 'normative' practices universities use to measure success with students. The term 'participation' in educational research often describes restrictive, culturally specific and normative notions of what constitutes 'acceptable' student practice.

Similarly, Shernoff (2013) quotes Christenson, Reschly and Wylie's (2012) definition of student engagement as

> …active participation in academic and cocurricular or school-related activities, and commitment to educational goals and learning (p.50)

Practice-based studies of 'engagement' regard 'participation' as a contrast to 'acquisition' which sees learning as an individual cognitive process but then tend to equate it 'unproblematically with activity or 'engagement' with an emphasis on 'doing' (Fenwick 2012 p.38), and human agency.

Kamstrupp's (2016) research with student teachers is particularly relevant to my own comparison of classroom and gaming practices, because she discusses the field of tension between being active and sedentary through the concept of learning through participation. In this approach, learning, rather than being seen as the acquisition of a body of knowledge or 'having', is seen as a constant flux of 'doing'. Boredom would be seen as a lack of 'doing' in such an analogy, where a technology such as the 'lightbox' in Kamstrupp's account offered few possibilities for action in the present or the imagined future teaching scenarios of the student teacher.

Devices such as the iPad and IWB are mentioned similarly in my own analysis as offering either possibilities for action or affordances or constraints to student actions.

The other authors already mentioned such as Breidenstein (2007) discuss lack of participation as a problem stemming from the phenomenon of boredom, whereas Macklem (2015) and Belton and Priyadharshini (2007) focus more on boredom as a lack of attention or the inability to focus attention. Participation and agency are key to my own approach and analysis of activities in classrooms and gaming and discussed in more detail in Chapters 4 & 5.

Fenwick (2012) suggests that by including the participation of the material in educational practices, non-human participants such as texts, furniture, technology, we can ask questions about different modes of participation, the relationship to practices and how modes of participation are linked with different forms of learning. Similarly, different games produce different relations between touch and visual image changing the nature of participation in gameplay (Ash, 2009 p.2119). Human participation becomes a 'matter of attunement to things seen and unseen…a sense of building relations' (Fenwick, 2012, p.81).

Fenwick (2015), drawing on the ideas of Latour (2005, p.86) characterises participation as practice and emphasises that valorising specific forms of participation and pedagogy can lead to:

> …some practices and objects become stabilised and entrenched as powerful assemblages (such as standardised tests) while others go unnoticed? (p.8).

By identifying a hierarchy of assemblage, Latour, (op. cit.) helps us delineate 'matters of fact from matters of concern' (p.116-117). In this way we can differentiate between stabilised and entrenched practices and objects, everyday school practices such as paying attention and completing

homework, which Biesta (2015) labels as '…forms of pseudo-participation in which the activity is set and controlled by others (p.34). 'Real' participation relies on what Dewey (1985) calls a 'shared outlook' in which participants have a 'real interest'. Biesta (2015), quoting Dewey, advocates that schools focus on 'the creation of opportunities for participation in order for such a shared outlook to emerge' (p.34).

Bernstein (2004, p.201) identifies these forms of 'pseudo-participation' as stemming from a type of pedagogic practice which he labelled 'visible pedagogy in which the rules of regulative and discursive order are explicit, as Biesta (2015) says, '*set and controlled by others*' (p.34). Where rules are more implicit, Bernstein calls this invisible pedagogy. Visible pedagogy emphasises transmission and the performance of the student, the text they are creating and how it is meeting the criteria (Bernstein, 2004, p.106). Invisible pedagogy is more interested in the internal linguistic, affective and motivational procedures which lead to acquisition and competence. The primary interest for my study is that Bernstein's perspectives on pedagogies seem to provide strategies that allow us to disassemble practices analytically and to look in detail at the opportunities for participation. Bernstein's primary interest was in how school cultural practices affected the learning and participation of students from different class backgrounds. However, I argue that regulative rules and rules of discursive order such as sequencing, pacing, space and time which Bernstein used to compare home and school practices can equally be used to compare digital gaming and classroom practices.

In the next section I look in detail at some of the literature surrounding material cultures in classrooms and gaming and how participation is enacted through time and space.

2.2.3.3 Time

Leander (2007, p. 27) has argued that the problem of integrating the Internet (or other digital technology) into schooling is not simply a matter of the material properties of technologies or human capabilities but rather spatial and temporal. Online spaces and practices tend to involve more simultaneous activity, across multiple spaces and texts, which make practices more difficult to fit into traditional schooling practices.

Space-time in schools, structured by such artefacts as the timetable and the curriculum, involves sequential activity – everyone learning the same thing at the same time, each task having its own space (Bernstein, 2004). Bernstein has much to say on the subject of spatio-temporal arrangements in school and how practices associated with them might advantage or disadvantage the practices of middle or working-class students. Concepts of space-time revolve around the concepts of visible and invisible pedagogy and the ordering principles associated with each. Whilst visible pedagogy makes the 'rules of regulative and discursive order' (p.6) explicit, invisible pedagogy makes them implicit. Sequencing and pacing are functions of visible pedagogy where the focus is on measurable student performance – knowledge has to be acquired at a certain rate and content in the classroom is sequenced to meet age-related criteria. Many of the regulative and discursive rules of Bernstein's visible pedagogy were apparent in my field observations. Although I am not concerned explicitly with class, the power relations inherent in schooling structures and organisation and their influence on the regulation of time and space has a direct effect on the boredom and disengagement of all students.

Actor Network Theory too, is concerned with such power relations. As I discussed earlier, the stability of the network relies on 'powerful and entrenched assemblages' (Latour, 2005), certain sociomaterial practices which become prevalent. These practices bear a strong resemblance to the

ordering rules of Bernstein's concepts of visible and invisible pedagogy.

The ordering of time with regards to classroom practice is traditionally associated with the amount of time allocated to the delivery of the lesson and the speed at which the content is delivered or consumed. There is a strong assumption by teachers and also by OFSTED that fast pace correlates to student engagement, at least in regard to student behaviour and compliance. In Leander and Lovvorn's (2006) comparison of schooling and gaming practices, they mention that the student in their study was engaged by the struggle to keep up and the fast pace of talk in the classroom. Pace, as Sangster (2007) defines it, is 'the speed of delivery' or the maintenance of momentum in terms of classroom activities and delivery. Bernstein (2004) attributes the desire for strong pacing to the fact that it reduces pupils' speech, instead privileging teachers' talk.

The role of material artefacts in regulating time, whether they be digital or physical artefacts, is also discussed by a number of researchers (Davies, 2009; Jewitt, Moss & Cardini, 2007; Wajcman, 2018; Zagal & Mateas 2015).

Jewitt, Moss & Cardini's (2007) research into the multimodality and interactivity of the Interactive WhiteBoard (IWB) argues that the teacher's use of PowerPoint on the IWB plays a major part in structuring lessons and driving a fast pace. The ubiquity of the IWB and of PowerPoint in secondary classrooms was very apparent in my own study where16/19 of observed lessons made use of the IWB (Section 4.2.2 p.169). Jewitt, Moss & Cardini observe that the text design of the PowerPoint slides become a time management tool that controls class rhythm and pace. Equally student participation is structured by the teacher's actions and the pre-planned design of the PowerPoint text. Such structures appear to play a crucial role in student engagement. The flow of materials is controlled by the teacher – the screen is used to break down, link and connect elements of the lesson and its content which is central to the pace of the lesson as can be seen in the example in Figure 3 where activities in a Maths lesson are organised around

a central concept, with related materials and different associated tasks in blocks. This flow, however, can both engage students and mitigate against their participation. In particular Jewitt, Moss & Cardini mention differences between the shared use of the interactive affordances of the IWB and the teacher regulated use of them. In one example students used slates (individual electronic boards attached to IWB) to participate in a collaborative problem-solving session. The physical and spoken participation resulted in high engagement.

Other material artefacts which order time such as digital timetables and calendars are discussed by Wajcman (2018). He sees such artefacts as sociotechnical systems that orchestrate all kinds of human and non-human actors, including rooms. Timetables and calendars, whether digital or physical, adopt a linear representation of time. This reinforces the sequential organisation of time mentioned by Bernstein (2004) and to the 'systematic regimentation of human bodies moving in space to an x-axis measured in time' (p.10).

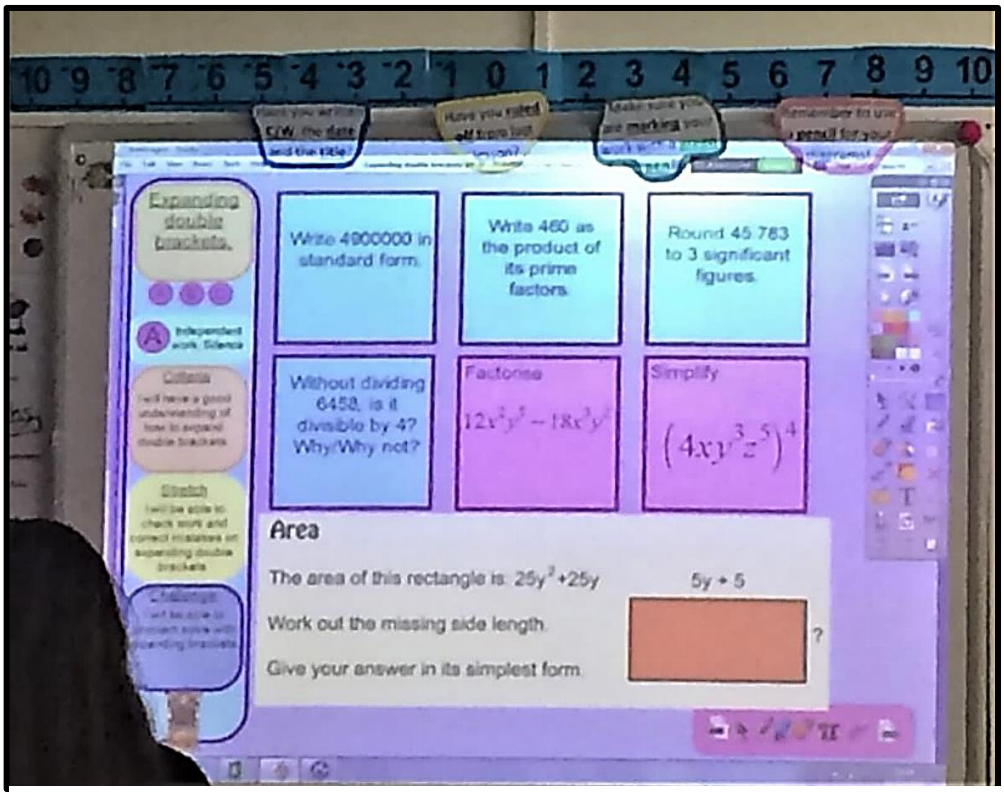


Figure 3 Example of pre-planned Maths PowerPoint slide, School E

Pace in videogames manifests itself as movement impetus – that is the will or desire of a player to move forwards through a game level. According to Davies (2009) a well-paced game level will have moments of action interspersed with calm. Davies uses music notation as an analogy to discuss pacing in games, considering concepts such as rhythm and flow, aspects already discussed by Jewitt, Moss & Cardini (2007) in relation to the use of the IWB and PowerPoint in the classroom. Too much calm becomes tedious but too much action can cause the player to become desensitised to the action. Many of the examples Davies (2009) provides in relation to pace in games could apply equally to classrooms. He says that movement impetus can be created by three elements: threat, tension and tempo. Although classrooms are not ostensibly associated with the sort of simulated physical threats in many games, 'threat' is present in the form of various pressures such as the threat of censure from the teacher, ridicule from classmates, pressure to succeed and so on. Tempo, which Davies describes as the level of intensity of action and how much concentration is required to perform a task is usually engineered by the teacher, perhaps with the introduction of time limits. In games this is called 'forced pacing'. Other elements Davies discusses such as presenting an objective, narrowing physical options, drawing the eye and having a third party lead the way to an objective are all translatable to classroom activities. Seating plans, visual aids and peer teaching are all part of classroom practice which share similarities to the gaming features mentioned. The main differences which struck me were that teachers are unlikely to plan the pacing of a lesson in as much detail as a game developer would plan a game level. Once planned, a game level is played over and over again by huge numbers of players, making such planning time and cost-effective. Details are fixed, such as the architecture, physical options and visual features. However, the main principles, those of encouraging movement impetus and ensuring moments of action and calm, are principles which could be included in any well-planned lesson.

Sociomaterial approaches regard the experience of time in a school as a 'network effect' emerging from the relations between students, technology,

objects *and* as they come into relation with each other, the constraints and affordances of the environment and so on. In such an approach objects such as clocks, timers and regulatory artefacts such as timetables and 'rounds' in gaming all have agency in assemblages, producing specific affective experiences for the human participants, as they come in relation to one another. A significant contributory factor to boredom and the students' experience of time in classrooms is their very lack of agency – timetables, clocks and school rules dictate the pace, duration and ability to act. Digital games, on the other hand, are a medium where agency is a dominant experiential effect, an effect induced by the player taking actions, within the constraints and affordances offered in the game world, which affect future events in the game, as I have already discussed in relation to Davies (2009) article.

Zagal & Mateas' (2015) relationist view of time in digital games, similarly to Mulcahy (2012) and her concept of 'affective assemblage', sees human experience as organised through events. Events establish periods of play, the constraints on availability of the game world, in-game actions and basic units of play such as a 'round'. Zagal & Mateus try to bring together event-based frameworks for analysing temporality in games – real-world time, game-world time, coordination time and fictive time. In-game events or actions performed by the player can trigger links between real-world time, coordination time and fictive time. In Davies' (2009) discussion of pace in a game level he describes it as movement impetus or the opportunities to take action. Compared to the way in which the relation between teacher and IWB control the flow of time in the classroom, the digital game provides more complex affordances for participation.

Leander and Lovvorn (2006) attribute the on-going engagement of their study participant with the Star Wars game to network continuity. They warn against attributing that continuity to gaming itself however, suggesting that both classrooms and games can be dull and unmotivating if immobile. Part of the immobility of classrooms is their linear, one dimensional view of time.

Learning is something which must take place in a classroom at the same time every week, for a specified time period and in a specified sequence for all students in a particular age group and subject. Activities are 'cut' at the end of the set time period of a lesson and along with it, engagement in that activity, they suggest.

In summary, the literature appears to suggest that the organisation and perception of time in classrooms and digital games have many similarities as well as some differences. These similarities, such as lack of pace, variation in tempo and agency in relation to actions suggest that affective engagement can be altered, with boredom and disengagement emerging from the relations between humans, technology, objects and environment in both settings. Creating affective assemblages relies not only on physical and digital artefacts such as timers, Interactive Whiteboards and game controllers but also on perceived objectives, threats and tensions and the provision of affordances and imposition of constraints.

In the next section I consider space as a concept and the role it plays, alongside time, in producing affective engagement.

2.2.3.4 Space

Space and place in education settings has commonly been assumed to refer to the physical environment in the shape of buildings and classrooms, regulated through timetables, bells, rules and organisation of desks. The spatial turn in both gaming and education research regards education spaces such as classrooms as constructed through relations between social and material actors. Research in this area considers space from various perspectives: through a consideration of the material cultures in schools (McGregor, 2004); the affective assemblages created through innovative learning environments (Lai, Huang and Lam, 2020; Mulcahy, 2012; Mulcahy &

Morrison, 2017); the disruption of the concept of classroom-as-container (Baroutsis, Comber and Woods, 2017; Burnett 2013) and the role of technology in the classroom (Jewitt and Jones 2005; 2009); the concept of digital materiality (Leonardi, 2010), and finally, through the nature of the image and how it creates spaces in videogaming (Ash, 2009; 2011). All of these perspectives are key influences on my own work.

When McGregor (2003; 2004) did her work on material culture in schools in the early 2000s, her focus on space as something created by social interaction was still uncommon within the literature on educational practice, where the emphasis was on physical spaces as containers for learning, in the shape of buildings and classroom design (Mulcahy, 2015). Baroutsis, Comber and Woods (2017) by contrast, are quite comfortable with the idea of educational contexts as social places and spaces. Although McGregor's primary interest was in school as a work-place I would argue that her interest in how objects or 'material forms' such as textbooks, blackboards and so on, are implicated in the 'active construction of social space' is equally important for *students* and cultures of engagement in the classroom. Her theory is that persistent forms of pedagogic or classroom practice are created by networks of objects, people, furniture and technology and reflect the power relations embodied in the material. This is echoed by Baroutsis, Comber and Woods (2017) who call it 'spatial governmentality' (p.9) pointing out that school rules are inherently spatial, controlling bodies, movement, talk, noise and so on. McGregor's focus on the material environment and her understanding of spatiality as based on space-time organisation was particularly influential in my analysis of the school curriculum and the role of the timetable in stabilising certain practices and objects in powerful 'assemblages'. Agency is discussed as 'an accomplishment of an assemblage of people, objects and technologies' (p.350), a notion from Actor Network Theory discussed in section 2.2.3.2, which enabled me to consider engagement / disengagement as dependent on effective mobilisation of the material within a network.

Agency and affect are central to the organisation and regulation of space in both digital games and classrooms. Mulcahy (2013) has written widely about innovative learning space in Australian education settings. Her sociomaterial approach rejects notions of learning space as a pre-existing framework – learning environments can be virtual, online, remote and are not tied to place. Affect, rather than purely an emotional reaction by humans to their physical surroundings becomes a sociomaterial process, with material objects and technology becoming part of an assemblage and affect emerging from that process. Her research around open-plan schools with few walls demonstrated how 'intensities of feeling' are provoked by objects such as walls being open or closed. More recent research in this area (Lai, Huang and Lam, 2020) in a secondary school in Hong Kong used interviews with teachers to examine how the affordances and constraints of the space were directly related to constructing and managing effective learning experiences and educational change for students. The interplay between cultural beliefs about subject learning, greater flexibility in newly designed teaching spaces and the availability of technology resulted in changes, not only to student collaboration and learning but to team teaching and greater teacher agency. The practices produced broke down the classroom as container and the distinctiveness of what Burnett (2013; 2014) calls 'classroom-ness'.

Burnett uses the 'classroom-ness' lens to break down the notion of 'classroom' as a single space. She is particularly interested in how technology helps us to conceive of classrooms as not contained within physical boundaries but connected to other places and their practices and meanings. Online spaces and places made available simultaneously through classroom technology, such as *Minecraft* and *Google Earth*, enabling students to exist and have agency in fluid and nested spaces. Burnett warns against conflating classroom-ness with regulation, in the sense of sanctions or constraints. She argues that classroom practices emerge partially through student preferences and purposes, but some are foregrounded whilst others are not. Although Burnett's work was in primary

schools, where students spend all of their time in one classroom, her description of online/offline experiences as a 'mesh of practices' was of particular relevance to my participants' experiences in a lunchtime *Minecraft* Club. Burnett (2014) draws on Massey's (2005) views of space and the way in which practices help sustain official spaces but also generate unofficial spaces. She notes three such unofficial spaces: framing interactions around screens, invading screens and on-screen activity prompting physical movement in the classroom. All three of these unofficial spaces were generated in *Minecraft* Club but official spaces, such as room layout and constraints on language and activity were also sustained by students at the same time.

In the next section I move on to consider another aspect of material culture in the classroom by considering how the use of technology in the classroom shifts the balance of agency towards the image and alters the nature of participation.

2.2.3.5 Materiality: participation and agency of objects and technologies

Jewitt et al. (2009) identify the Interactive WhiteBoard (IWB) as significant in English teaching practice, particularly how the image is used and interpreted compared to writing which directly echoes my own analysis in Chapter 5. However, from my sociomaterial perspective, it is their interest in how the IWB shapes teacher use of classroom space; the gaze of the class and student movement in the classroom which is significant. They suggest that

> …the IWB is embedded in rhetorical governmental and commercial discourses of interaction and participation. (p.13)

Such discourse is not borne out in the empirical evidence from my data which suggests that the knowledge-led curriculum dominates existing school practices based on teacher-led direct instruction in many English schools. Their example of a teacher using individual whiteboard peripherals to participate in learning on the IWB resulted in high student engagement but is not common practice. On the contrary, in the many classrooms in which I have been an observer over the past 10 years, the IWB has become an enhanced teacher presentation tool, with agency which supports traditional power relations in the classroom. I would also take issue with the assertion in Jewitt et al. (2009) that the use of YouTube[11] and internet image banks in English links with out-of-school practices and technologies in a way which draws into question what is socially valued. My own experience and data suggest that what is socially valued in English classrooms is still writing, largely handwriting, rather than the electronic form.

Whilst Jewitt et al. (2009) are interested in the use of image in the English classroom, Ash (2009) explores the idea of experiencing an image, specifically in videogames, as an 'embodied event', something constructed performatively in a moment rather than something that we simply look at. In

[11] **YouTube** is an American online video-sharing platform www.youtube.com/gaming

later work, Ash and Gallacher (2011) approach digital games from a cultural geography perspective as spaces, taking an assemblage approach (discussed in section 2.2.1) in which events shape or produce different forms of spatiality and spatial experience. The implications for my study are that construction games such as *Minecraft*, which are commonly used in schools and indeed in my study, would produce very different spatial experiences from a first-person shooter[12] like *Rainbow Six Siege*[13]. According to Ash and Gallacher, interaction between player, interface and location create the world of the game – the world emerges through the practices of the players.

> …the experience of playing the game, the code used to produce the game, the materiality of the interface, the rules that govern the game… work together to reorganise and change users' practices of thought and action (p.360)

The materiality, practice and embodiment which constitutes players' participation in the game play experience has major implications for the way in which engagement emerges or is performed. Affect is a reciprocal process between human bodies and objects and technologies.

The issue of materiality of digital technologies in school settings, whether in the form of digital games or other technologies such as the IWB, is tackled by Leonardi (2010). He introduced two definitions of materiality: those of 'practical instantiation' and 'significance'. Leonardi argues that existing research has already established that physical artefacts matter for the way people organise work (or learning) and how that work affects them. Dezuanni (2018) also postulates that individuals 'author and interact with digital materials as material practice' (p.239). Leonardi concludes that the material properties of technologies are important where they provide users 'with the capability to perform some action' (p.5). This is comparable to

[12] First-person shooter (FPS) is a video game genre centred on gun and other weapon-based combat in a first-person perspective; that is, the player experiences the action through the eyes of the protagonist. https://en.wikipedia.org/wiki/First-person_shooter

[13] *Rainbow Six Siege* is a tactical shooter video game with a loose narrative, focusing on recruits going through training to prepare them for future encounters with the White Masks, a terrorist group that threatens the safety of the world. Full description in section 4.

Gibson's (1979) idea of affordances as qualities of the environment which are offered to people. Digital gameplay, although it has no physical properties, provides the capability to perform an action through the constraints and affordances in game mechanics, in the same way as a physical game might provide a board or pieces. Sociomateriality attempts to dissolve the boundary between the social and the material by acknowledging that social practices shape the materiality of a technology and vice versa.

Explicitly sociomaterial accounts of engagement in digital gaming include Johnston (2018); Dezuanni (2018); Hung (2016); Ash and Gallacher (2011); Cypher and Richardson (2006) and Apperley and Jayemane (2012) who stress the importance of not treating games as homogenous objects, but considering the diverse and material practices in and around gaming. Cypher and Richardson point out:

> Practices such as black-boxing encourage us to 'naturally' assume the humanist stance that complex machines like computers are mere tools, separate from and without influence when it comes to human activity. (p.4)

Similarly to McGregor (2003; 2004), Hung (2016) and Cypher and Richardson (2006) also use Actor Network Theory, the former to analyse three different physical and social contexts for game play using the analytical tools of network assemblage, translation and multiplicity as a focus and the latter to achieve a more 'nuanced understanding than the usual user-and viewer-centred interpretations in game studies' (Hung, 2016, p.1). Hung focuses on how different sociomaterial configurations of gameplay such as Xbox Live, personal PC and internet café can create different kinds of players, practices, roles and knowledge. Like McGregor, Hung uses ANT to focus on network assemblage, that is what humans, technologies and routines need to be in place for gameplay. This involves:

- translation - what holds their network together, and how these networks can be disrupted

- multiplicity - what other actor-networks exist that affect their play experience, in-game strategies and relationships.' (p227)

By doing this he reveals material and symbolic constraints which might obstruct agency or exclude humans from participating in practices. Cypher and Richardson's (2006) discussion also focuses on translation - how agents, human and non-human in multiplayer online games, all contribute to establishing a network which stabilises relations in MMOG or MMORPGs[14], where engagement is constantly changing, and interaction and agency are complex.

Likewise, McGregor (2004) sees the classroom as an assemblage; a relatively stable network with persistent forms of pedagogic practice, with power relations 'inscribed and embodied in the material' (p.355). Such pedagogical practices perpetuate patterns of engagement in the network enabling us to understand how disengagement is co-constituted within an assemblage. Cypher and Richardson's (2006) discussion of translation has enabled me to explore how human and non-human agents establish networks in school classrooms in contrast to gaming environments. I have focused on how material and symbolic constraints may obstruct agency in these contexts and exclude humans from participating (Hung, 2016), in particular, in schooling practices which are heavily influenced by standards and assessment. In the next section I move on to consider research which shares my ethnographic and sociomaterial approach in relation to classroom and gaming practices. I also review literature around the use of the digital game *Minecraft*, which was part of my own fieldwork.

[14] MMOG – Massively Multiplayer Online Game, online game with large number of players MMORPG – Massively Multiplayer Online Role Play Game, similar to the above but with online role play involved.

2.3 Existing sociomaterial ethnographic studies

In the past fifteen years there have been a growing number of studies similar to this one, research which takes an ethnographic approach to explore the practices around home gaming, gaming in school and classroom practices. Several of these studies focus specifically on the digital game *Minecraft*, which I have used in this study. Sociomaterial approaches such as rhizomatic theory and Actor Network Theory have become favoured in this field of research, because of their ability to explore practices across formal and informal settings.

I found three studies particularly helpful in my own work: Leander & Lovvorn (2006), and two PhD theses, Bailey (2017) and Johnston (2018). The first two studies, like mine, are ethnographic, with the third, Johnston (2018) deeming her approach 'post-qualitative', drawing on Deleuze and Guattari's (1987) rhizomatic approach to design a qualitative study with different notions of researcher role, data and analysis. All are concerned with literacy practices in schools. Leander and Lovvorn (2006) and Johnston (2018) conducted their research in secondary schools in the US and Bailey (2017) in a primary school in England. Games were a part of Leander and Lovvorn (2006) and Bailey's (2017) studies, with Bailey focusing on *Minecraft*, as I do in this study. Johnston's (2018) study deals specifically with affective engagement in literacy practices, through the use of technology.

Leander and Lovvorn's (2006) ethnographic study of one student compared his literacy practices in a Star Wars videogame with his practices in the English classroom. Leander and Lovvorn use Actor Network Theory to analyse the student's literacy networks across classroom and home gaming settings, in order to understand engagement, agency and identity. Their ethnographic approach to literacy networks is based on the premise that network effects, such as engagement can be examined empirically. They aimed to develop new ways of thinking about space-time, beyond the

context-as-container. They argue that space-time is organised by networked actants and that '...different literacy networks afford distinctive possibilities for engagement, agency, and identity.' p.41. Amongst their findings they discovered that network continuity, which is crucial in engagement with an activity, was one of the main reasons why levels of engagement in home gaming were much higher. The way that time and space is organised in classroom activities means that continuity is cut and engagement is lost. In the example given, their participant gives in a project which they have been working on over several weeks. It is two weeks later before the student hears anything about the project or gains any feedback, by which time they have completely lost interest in it. Videogames, by comparison, give continuous and sustained feedback on player actions which maintain engagement and progress in the game. A similar example to this occurred in my own fieldwork where activities which had been designed in *Minecraft* were organised around the space-time constraints of the curriculum rather than the game itself. Consequently, students were bored and disengaged, something I note in section 5.1.1.1, where I analyse the organisation of time through the material agency of a lesson booklet.

Johnston's (2018) work focuses on the 'normed expectations of students' engagement in literacy' (abstract), a theme already discussed in section 2.2.1. These expectations are aligned to outcomes and assessment objectives and to norms of behaviour, attitude and emotional responses. At the end of the last section I discussed McGregor's (2004) view that power relations become inscribed in the material and pedagogical practices of schools, perpetuating patterns of engagement in the network. Johnston feels that disrupting these norms of schooled literacy engagement is in the interests of social justice. She argues, similarly to my own study, that by recognising a wider variety of interpretations of engagement in the classroom we can avoid devaluing in-the-moment, affective engagement from groups of different ability, race and class. Johnston cites an instance of an apparently disengaged student who uses her phone to engage in writing her own story, a much more sophisticated response to literacy than the

classroom activity she has become bored with. This example helped me to consider the effect of varying the way that students can respond to literacy tasks I observed in my fieldwork. By valuing a wider range of responses, we might increase affective engagement and avoid boredom and disengagement. Gaming activities, in particular, help to illuminate what Bailey (2017) calls the emergent features of spontaneity, imagination and performance.

Bailey's (2017) study of a *Minecraft* club in a primary school over the course of a year aimed to explore the lived experience and participation of children in virtual world gameplay. Similarly to Johnston (2018) and Leander and Lovvorn, (2006) Bailey (2017) quotes Merchant (2010), in noting how teachers are constrained by institutional norms and routines. They prevent teachers from regarding activities in *Minecraft* as valuable literacy experiences in their own right, rather seeing them as helping to support curriculum goals. This was very much my own experience, when introducing the use of *Minecraft* in a secondary school English classroom (section 5.2). In contrast, Bailey values the *Minecraft* Club he ran as an opportunity for experimentation. He notes that virtual space was not used as an alternative to the physical space, rather it was entangled with the classroom. It was a shared space which could be used to break down the barriers between home and school. Bailey does not specify exactly how this might benefit learning in the classroom because his declared aims are to document the lived experience of students, add to the scholarship on virtual world play and to develop a new methodological approach which he calls 'rhizomic ethnography'. In my study I have considered how the use of *Minecraft* might re-structure the relationship between teachers, students and technology. By valuing the students' expertise with iPads and *Minecraft*, affective engagement can be increased. This expertise is cultivated out of school, in the home environment, something Leander and Lovvorn (2006) document in their account of a single student's activities in at-home game play and the English classroom.

In summary, all three studies successfully use sociomaterial theory and concepts such as Actor Network and rhizomatic theory to explore classroom and gaming practices and how they relate to engagement. All three seem to conclude that in large part, it is the immobility of actors (Leander and Lovvorn, 2006), 'normed expectations of students' engagements...' (np) (Johnston, 2018) and the constraints of institutional norms and routines (Bailey, 2017) which are preventing the enactment and emergence of engagement, in fact may be actively responsible for boredom. As a conclusion to my discussion of existing literature on games and engagement I explore the specific research around the use of *Minecraft* and why it is particularly pertinent and interesting in a sociomaterial study of engagement.

2.4 The place of *Minecraft* in the classroom

2.4.1 Background and Context

Before discussing research about *Minecraft* in the classroom some context and background to its use in education over the past nine years is necessary. As previously stated, (p.10), in this study I have chosen not to include any digital games specifically designated as educational games, whose primary focus is learning rather than entertainment and fun. Commercial games have their own 'mode of existence' with typical characteristics which are different to those of the classroom (Decuypere and Simons, 2016). As such I have theorised that *Minecraft* may act as a boundary object (p.32) providing a sense of continuity across different environments such as *Minecraft* Club, home and English lessons (Chapter 5.1.1) and encouraging students to engage in learning can make connections between what they know themselves and what they are being explicitly taught in the classroom. *Minecraft* was created in 2011 as a commercial, sandbox video game, published by Mojang. It became immensely popular with children and an

educational version, *Minecraft*EDU, was quickly developed in the same year, by a Finnish company called TeacherGaming. When *Minecraft* was bought by Microsoft in 2014, they also took over *Minecraft*EDU (in 2015), now known as *Minecraft* Education Edition.

Minecraft Education Edition has a huge range of educational and subject-specific content, in the form of 'worlds' which can be downloaded for students to play in and/or teacher guides/schemes of work and worksheets (Fig 2). This version of the game is sold as an educational game, with learning as the primary focus. Much of the research I discuss in the following section was conducted prior to the Microsoft takeover and discusses the commercial version of the game and/or the original *Minecraft*EDU version rather than *Minecraft Education Edition*.

The commercial version of *Minecraft* provides an 'empty' world, albeit with biomes and digital resources in the form of blocks, but the structure and direction of play is left to the player and most importantly, there is no concrete goal or end to the game. Although the original education version of *Minecraft*, *Minecraft*EDU, did provide teacher resources, TeacherGaming's contribution were game controls which could be applied to the game with discrimination and were intended to enable teachers to integrate the game into existing classroom activities whilst continuing to use traditional classroom management strategies. These included the ability to 'freeze' play so that students' attention could be gained at appropriate moments, the distribution or withholding of digital resources, the ability to disable TNT[15] and so on, with gameplay constraints and affordances left largely untouched. In the *Minecraft* Club in my study, a group of students were responsible for the application of these controls. Such tools have continued and been extended in *Minecraft Education Edition* (section 3.3.4.1 p.88).

[15] TNT - Trinitrotoluene, an explosive 'block' which can be detonated in the *Minecraft* virtual environment, destroying any other blocks in the vicinity.

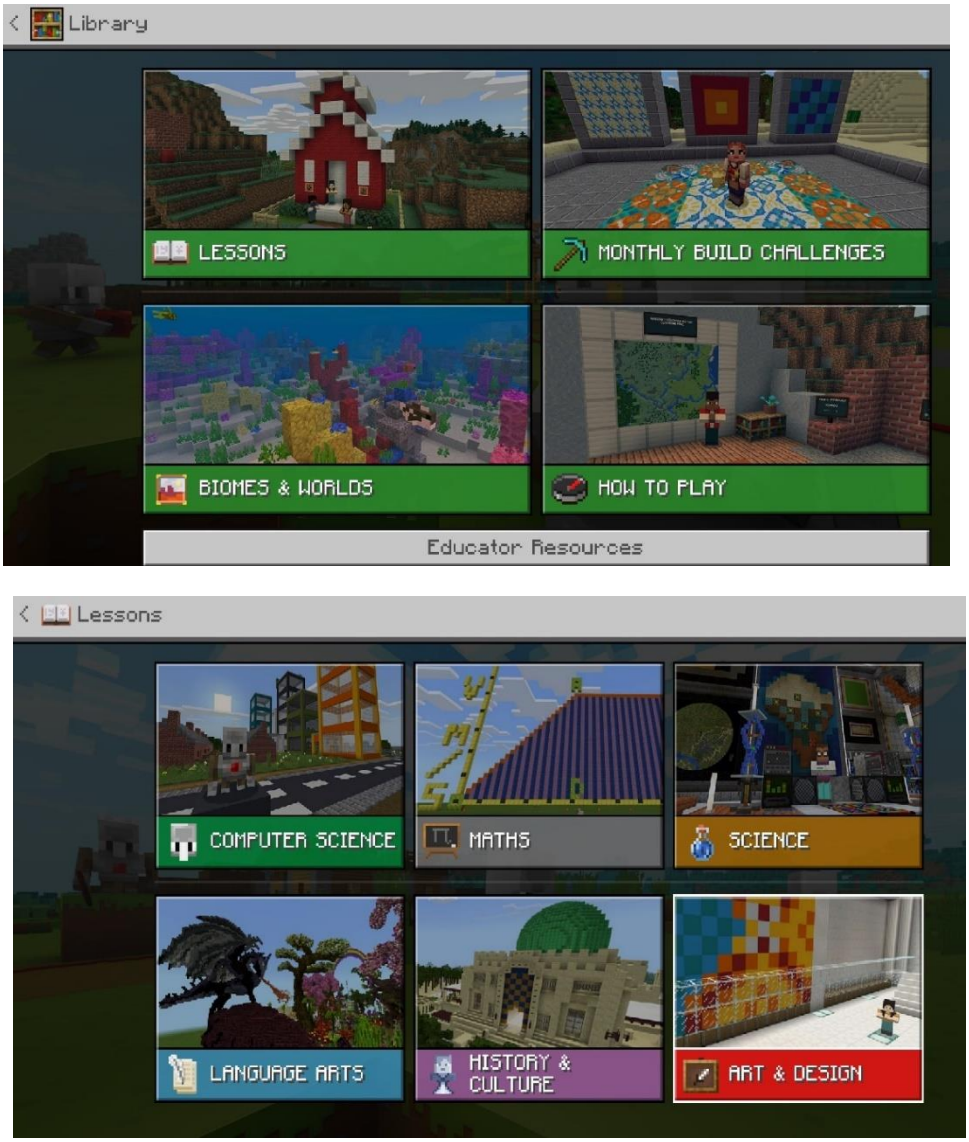


Figure 4 Minecraft Education Edition: Lesson materials

2.4.2 *Minecraft* in the classroom

As Schifter and Cipollone (2013) point out, when games are introduced to the classroom they are played in an environment of testing and accountability, both in the US, where they did their study, and in the UK. Even with adaptations such as those described in *Minecraft* Education Edition above, using a commercial game in the classroom comes with risks

for the teacher. The effect of the constraints that have been introduced in the education version of *Minecraft* in comparison to the commercial version have not been studied but should be borne in mind when reviewing the literature on *Minecraft* in educational settings.

I have reviewed a selection of research on *Minecraft* in the classroom starting in 2013, but clustered in the period 2015-2018. The key themes which were related to my own research were the agency and engagement of students; the role of the teacher; the relationship of game play to school organisational and assessment structures and the nature of game play in engagement and learning processes. I was also interested in research which took a sociomaterial approach to *Minecraft* play in educational contexts.

Two studies, which both took sociomaterial approaches, looked specifically at the commercial version of *Minecraft* and gameplay in settings outside the classroom, through the experiences of one child. Hollett and Ehret's (2015) ethnography mapped the experiences of Bean, an oncology patient in a hospital whilst Dezuanni (2018) documented his own children's game play in a *Minecraft* world called Babylon. Particular areas of interest for me lay around an understanding of the gameplay experience as an assemblage (Hollett & Ehret, 2015) and the idea of place as an event, formed through 'the convergence of various actors' (p.1852). Dezuanni (2018) was interested in media literacy and digital making rather than engagement but his discussion of how *Minecraft* game play is assembled and performed and how multiplayer systems mediate gaming experience and motivations for participation contain much which I found to agree with in my own analysis of data. According to Dezuanni, *Minecraft*'s affordances allow an experienced player much flexibility to customise the game to make it 'playable' for themselves and others. The concept of distributive agency as something which is assembled in different ways for different purposes depending on the affordances of *Minecraft* offers interesting ways to consider classroom practice. The limitations in the range of classroom affordances and students' ability to customise their educational experience is a theme I pursue in my

own analysis.

Other studies, such as Callaghan (2016), Ellison and Evans (2016) and Schifter and Cipollone (2013) explored literacy practices in school settings. Although I am not concerned with literary practices but rather boredom and disengagement, both Callaghan (2016) and Ellison and Evans (2016) take a practical approach to classroom and gaming practices with findings or conclusions which support the themes of this thesis. Practical, teacher-based case studies and action research projects around *Minecraft* are common. Other studies of this ilk include Smeaton (2010) and Marcon (2016).

Ellison and Evans' (2016) article does not deal with a specific age group but aims to offer effective principles for teachers to use to understand and apply *Minecraft* in the classroom, as well as reviewing previous literature about educational games. Similarly to this study, they are directly concerned with student engagement and agency and the opportunities for active participation in virtual worlds like *Minecraft*. They suggest that working in *Minecraft* would benefit students' learning in STEM/STEAM (Science, Technology, Engineering, [Arts], and Math) and English Language. However, although they suggest that *Minecraft*'s multimodality is important in engaging young people, offering affordances which allow collaboration, creativity, critical thinking and problem-solving, they do not offer any new empirical data of their own, nor any suggestions about theoretical frameworks for evaluating learning in games beyond 'youth participatory action research' (p.38).

In contrast, Callaghan's (2016) empirical data is very similar to mine. She is a secondary school technology teacher who conducted a case study comparing the activities of a Year 7 (11-12-year-olds) technology class with their activities in a school *Minecraft* club in the same school. Like Ellison and Evans (2016) her study is practical but descriptive and lacking a theoretical framework which would enable teachers to evaluate and understand their own and student practices.

Schifter and Cipollone's (2013) study is with Year 10 (14-15-year-olds) English class; they are interested in the effect that the organisational culture of schools has on the implementation of *Minecraft*. The more collaborative and constructive approach to assembling knowledge differs from the traditional instruction-centred approaches favoured in both the US and UK educational systems at the moment. Schifter and Cipollone conclude their study with the recommendation that *Minecraft* be used to explore alternative ways to assessing knowledge, that student understanding be demonstrated through activities and constructions in the *Minecraft* game environment, as it could be used to explore alternative ways to demonstrate engagement/disengagement.

Most of the ethnographic studies of *Minecraft* I have discussed in this section used a similar approach to my own, albeit with a focus on literacy practices, rather than disengagement. Despite this difference in focus, the literature raised interesting ideas around gameplay experience as assemblage, place as event and the idea of distributive agency. Schifter and Cipollone (2013) raise the issue of using *Minecraft* and game environments to allow alternative ways of assessing students, something I incorporate in my own recommendations.

However, I also noted that many studies in this area are not theoretically based but rather teachers sharing practices of using *Minecraft* in the classroom.

2.5 Conclusion

In this chapter I have reviewed a range of literature relating to my study, beginning with existing psychological concepts of boredom and disengagement in formal learning. Researchers such as Macklem (2015) and Belton & Priyadharshini (2007) suggest that more work around boredom in educational settings is necessary – it has become regarded as an inevitable, even desirable part of schooling by some (Breidenstein, 2007). The cultural, political and economic context of schooling and educational policy in English schools has important implications when considering disengagement. Thinking about educational practice has been constrained by restrictive, culturally normative notions of what constitutes an engaging and effective student learning experience (Biesta, 2015; Mulcahy, 2015).

Research which takes a sociomaterial approach (Fenwick, Edwards & Sawchuk, 2015; Müller & Schurr 2016) regards disengagement and boredom as performative, as phenomena assembled in space and time, rather than as represented in the behaviour, attitude and achievement of individual students. Studies taking such an approach move away from the concept of classroom-as-container which makes distinctions based on setting or context, such as in-school and out-of-school, and associate different settings with different practices. By substituting the construct of a learning network, such binaries cease to have meaning and engagement and learning become ongoing processes co-constituted in the relations between persons, tools and learning environments. Mulcahy (2012) refers to these processes as 'affective assemblages', when bodies, tools and environment come together to create either boredom or engagement.

My research contributes to the existing work on boredom and disengagement in several ways. Although there have been a number of studies of digital literacy and gaming in secondary schools, none have specifically compared how engagement or disengagement emerges from the practices of a group of students in both gaming and classroom

environments. Secondly, as Biesta (2015) suggests, research which provides teachers with different ways of seeing and talking about education is as important and relevant as that which can show a direct relationship between cause and effect in the classroom.

In the following chapter I explain the methodological approach taken to accumulate a body of empirical evidence of the sociomaterial practices in digital games and classroom.

Chapter 3 METHODOLOGY

3.0 Introduction

Although the ontological position taken in this study is a sociomaterial one, my early exploratory work assumed engagement was constructed through interactions between people, with social and cultural influences being very important (Burr, 2003; Kuhn, 1962). Engagement/disengagement from learning could, therefore, be explored through interpretations of student experiences within different, culturally specific contexts such as school classrooms and commercial videogames.

Based on this assumption, I had intended to use narrative ethnography as an approach, collecting the stories of students' disengagement from classroom learning alongside their narratives of game play experiences to enable me to discern the nature of their differing interactions and consequent engagement with learning within these two contexts. My premise was that engagement might be dependent on the interactive process of jointly constructing and interpreting experience with others (Edwards, 1997), a cultural narrative in fact, which was influenced by the nature and formality and context in which it took place. I hoped to use narrative analysis as

> … a means of examining participant roles in constructing accounts and negotiating perspectives and meanings (Edwards, 1997, p384),

hence revealing the nature of the mismatch between engagement in gaming and in formal learning.

Having begun the data collection for a narrative ethnography it became apparent that it was not solely the human subjects, the students, who were of interest or significance in engagement with the activity of learning. The material conditions of the activities, the location, objects and technology,

seemed just as likely to be related to engagement or disengagement from learning. Consequently, a classic anti-realist or relativist ontology with a constructivist epistemology might be unhelpful and unsatisfactory for either understanding the social ***and*** material nature of the phenomenon of engagement or the binary nature of the issues in my research scenario – formal-informal learning, digital-non-digital learning and engagement-disengagement in learning.

Within sociomaterialist ontologies on the other hand, specifically the theory of assemblage described by Deleuze & Guattari (1988), objects and bodies are not regarded as separate, instead humans and material, social and abstract entities are relational. Reality is produced through the relationship of bodies, ideas and things. The concept of assemblages of relations rather than separate entities is the key idea in this ontology. These relations operate in an unpredictable network in constant flux, reassembling in diverse ways. (Potts, 2004, p.19). Networks operate as 'machines' that do something or produce something, perhaps something like disengagement.

If engagement/disengagement can be regarded as a phenomenon produced by a network of relations between students, classrooms, gaming spaces and learning activities, binaries such as formal and informal become irrelevant and context is no longer a 'black box' within which learning occurs.

The second important aspect of new materialist ontology is that the conventional conception of human agency is replaced by the notion of affect, which means the capacity to affect or be affected (Leonardi, 2012). In an assemblage there is no subject and no object, no single element which possesses agency. As Deleuze and Guattari (1998) discuss, affect is a 'becoming', that is a change of state or capacities on an entity (Massumi, 1988) which may be physical, psychological or social. If other elements of an assemblage can have agency, it may be possible to intervene in this network, to change social or material elements to minimise the possibility of

disengagement from learning. As a 'critical educator' (Postma, 2012, p.155), I wanted to do more than provide a narrative or express the perspectives of the disengaged – I wanted to 'create the conditions for students to 'enact a different reality which challenges the dominant forms' (p.155).

My research questions ask:

- Is there a connection between high stakes assessment, the need for predictable outcomes and disengagement in classrooms?

- Do interpretations of boredom and disengagement as attributes of the individual student restrict research understandings and opportunities for intervention?

- What is the value of re-framing educational practice as a spatial practice? Does it enable meaningful comparisons with other practices such as digital gaming?

- To what extent does digital gaming offer a productive contrast with classroom practice and the way we understand boredom and disengagement?

3.1 Designing my study

As Hultin (2019) and Mueller et al. (2012) highlight, there has been little guidance for sociomaterial researchers on how to design their studies. However, in a recent paper, Macleod et al. (2019) point out that actor network theory and ethnography both focus on practices: the things people say and do and the relations with objects which make up everyday life. This was a key part of my decision to use an ethnographic case study to explore engagement practices, informed also by my ontological perspective and

the specific suitability of this approach for school-based research of learning demonstrated in a number of recent studies (Niemimaa, 2014; Oliver, 2012 and Sørensen, 2009) and game-informed learning studies (Apperley and Jayemane, 2012; Satwicz, 2006; Taylor, 2002).

Although ethnographic research is commonly associated with interpretive research, it incorporates understandings of 'the materiality of everyday life'. (Niemimaa, 2014, p.2). Many researchers have called for material ethnography which highlights both the role of material objects and human practice (Macleod et al. 2019; Oliver 2012; Roehl, 2012; Sørensen 2009). In gaming studies researchers such as Apperley & Jayemane (2012) also advocate ethnographic methods, citing the ability to connect objects to practices and enabling us to untangle the complicated relations which take place in the multi-layered practices of gameplay spaces and classrooms. By following the many actors that assemble in learning and gaming situations, a sociomaterial ethnographic approach can make practices visible and move beyond methods which centre on individual human agents (Macleod et al., 2019).

Defining ethnography is problematic (Hammersley, 2018) but for the purposes of this study, as Hammersley suggests, and for the reasons outlined in the previous paragraph, ethnography is a research strategy appropriate to answering my research questions which are strongly oriented towards a performative view of the phenomenon of disengagement. Several recent ethnographic studies around the use of games in classroom settings which share my approach are discussed in section 2.3.

Hammersley lists some of the elements usually present in ethnographic research: it usually involves a long-term process of data collection, takes place in 'naturally occurring settings', relies on participant observation and employs a range of types of data, with the aim of documenting what is actually going on (p.4). However, as Hammersley identifies, some of these defining elements are problematic, specifically what constitutes a 'naturally

occurring setting', a contentious issue in my own work which I discuss in the following paragraphs.

The collection of data in this study took place over two years, beginning in June 2016, with the majority of data collected in my case study school in a concentrated nine-month period from February – November 2017. In order to observe and record the enactment of engagement and disengagement, I needed to 'follow the actors', an imperative best achieved by immersing myself into contexts such as school and digital gaming. In ethnographic studies this usually involves becoming an 'observing participant' (Walmsley, 2016) who is immediately there, in the situation and able to note the routine performances of other actors such as students, technology and so on, in a 'naturally occurring' setting (Hammersley, 2018).

However, some situations which I would have wanted to observe directly were impossible to access, such as home game play or observing how participants learnt new games. My access to study participants was limited to my case study school, School E. I did not have access to participants' homes or other places they frequented. As a consequence, on a few occasions I engineered a 'setting' or situation, either by asking participants to take part in a process such as playing a game whilst I observed, video recorded and discussed it with them or by asking them to provide audio commentary within a more arguably 'naturally occurring' home game play session.

The micro-ethnographic methods (McGregor, 2003) of investigation I used in this study involved mapping and documenting physical and virtual space, observing patterns of use and interaction - a mixture of interviews, participant observations, field notes and collection of artefacts such as photographs and drawings to enable me to map the inter-relations of spatial, learning and engagement practices and how they create particular kinds of learning affects (Kraftl, 2016). Spatial strategies such as room layouts, for example, can be used to manage behaviour and the way that power is

negotiated between teachers and students (Pike, 2010), an aspect I explore in Chapters 4 and 5. Mapping movement, the affordances of spaces and the affective experiences of participants in these spaces requires a variety of data types – diagrams, photographs and interviews to generate evidence about the diversity of enacted engagement or disengagement (Oliver, 2012).

The rest of this chapter is divided into three sections which begins with a discussion of the ethical implications of my work with secondary school students, particularly those with special needs. It is followed by a brief overview of the place of the researcher in ethnography, in particular when that takes place within a sociomaterial approach. In Section 3.3.3. (p.84) I explain my rationale for selection of a field of study, followed by the narrative of how I accessed my field site and selected participants within this research assemblage. In Section 3.5 on Methods, I discuss in detail the potential of research apparatuses such as observation, interview and photographs for generating a body of evidence about the enactment of disengagement in learning assemblages. The chapter concludes with my data analysis process and the analytical strategies which influenced it, in Section 3.6.

3.2 Ethics

Prior to both my initial data collection in June – July 2016 and my later fieldwork in the period February – November 2017, I sought and gained ethical approval from the University of Edinburgh (School of Education) and followed their ethical guidelines and those set out by the British Educational Research Association.

I worked mainly with children between the ages of 11-16 years old in English secondary schools. Whyte (2006) recommends that researchers who are working with children should have certain qualities or qualifications. One of

these is police clearance. Currently it is the responsibility of any educational establishment in England to ensure that all adults working unsupervised with children on a regular basis have a current and enhanced DBS[16] certificate (DoE, 2012). The DBS certificate is usually acquired by an individual through their employer, who applies to the Disclosure and Barring Service on an employee's behalf. Although I did not intend to work unsupervised with students whilst undertaking my research in any of my pilot schools or my case study School E, I felt it would add a level of reassurance for schools and parents if I acquired a Basic Disclosure Certificate (Disclosure Scotland) through the University of Edinburgh (since I was not an employee of School E). A copy of the certificate was taken by all schools I worked with (a safeguarding requirement) and held on their records for the duration of the data collection period.

Schools in England operate in a climate of constant surveillance, which is, according to Page (2017)

> Enacted through an assemblage of strategies such as learning walks, parental networks, student voice and management information systems…as a means of managing the risks of school life, driven forward by neoliberal notions of quality and competition (p.1)

If they are perceived to be falling short in any regard head teachers are often forced out immediately, with their school subject to 'academisation', taken away from Local Authority control and placed within semi-privatised academy chains (Roberts and Hill, 2020 p.13). Teachers are aware that they are surveilled at all times principally through regular lesson observations and accountability of achievement measures such as examination results (Page 2017). Undertaking research in this climate I felt it was very important that

[16] DBS – The Disclosure and Barring Service is part of the Home Office of the United Kingdom. The DBS enables organisations in the public, private and voluntary sectors identifies candidates who may be unsuitable for certain work, especially that involving children or vulnerable adults. All people working with children or vulnerable adults are required to have an up-to-date certificate which institutions such as schools should take a copy of before that person is allowed to work or communicate alone with children.

teachers did not regard my research as yet another form of surveillance. This was one of the reasons for adopting the 'deep hanging out' approach designed to reassure both school and participants that I was one of them, living the day-to-day life of the school alongside them. I discuss this approach in more detail in Section 3.3.3

Although intended to reassure them, the 'deep hanging out' approach also had potential ethical implications with regard to power relationships, confidentiality and anonymity (see section 3.2.1). To some extent, both the adults and students in my study were co-researchers (Walmsley, 2016), particularly the teacher who organised the English Intervention classes. We planned a set of lessons together, discussed their content and purpose at length and undertook a joint review at the end of the process. A follow up interview with the lead teacher responsible for the Intervention lessons suggested that she gained as much from the process as I did, in terms of future practice:

> I think as far as… programme it would probably really be a good idea if we give them the opportunity to explore the actual programme itself, have fun building stuff with each other and then creating something of consequence out of that as well cos I feel like some of the pieces of writing might have been a bit perfunctory and we could have got some better progress out of them for that.
>
> (Teacher interview, 23rd April 2017, Appendix 11 ll. 29-31)

With this in mind I provided them with a suggested modification to the lesson series based on our mutual experience of using *Minecraft* in English lessons.

3.2.1 Confidentiality and anonymity

In the looser, more informal 'hanging out' which I undertook with students, the power relationship between myself and the student participants was not equal however, since I was an adult in a school setting not a social one, albeit an adult with similar interests and sensibilities. The informal and social nature of our interactions meant that both students and staff were likely to share information they might otherwise not have done in a formal interview or observation situation and may also have felt under pressure to work with me. It is important to advise children about the limits of confidentiality before consent is sought (Gray & Winter, 2011). The consent form (Appendix 5a) advised students that were they to disclose anything which I felt needed to be passed on to the safeguarding officer in the school then this would happen. The name of the safeguarding officer in each school was specified on all consent forms, for students, teachers and parents (Appendices 4-6).

All participants and schools were assured that any data used from interviews, recordings or photographs would be anonymised, as far as possible, by pseudonyms. Few photographs of individuals were taken and of those, they showed only a back view with no faces visible or if that was unavoidable, faces obscured. Any photographs of school buildings or signage have had identifying logos or titles obscured also.

For the initial period of data collection in *Minecraft* Club and English Intervention classes at my case study school, I issued a separate information sheet and consent form to both the teacher and the students. The information leaflet (Appendix 5) for students was written in age-appropriate language and format (Harcourt et al., 2011) and it spelt out what was required from participants. The same information was also explained orally. Interested students were asked to read and sign the consent form (Appendix 5a) before taking part in interviews or informal chats. Parental consent was not required at this stage since all planned research with students would be

occurring during the school day and under the supervision of the teacher. Students were informed on the consent form that they could drop out of the research at any point. However, I adhered to what Dockett, Perry and Kearney (2013) calls 'process consent' where participants are given multiple opportunities to give or withhold consent (Section 3.2.3).

3.2.2 Special considerations

Three out of the five core participants in my study self-identified as having an additional or special educational need, such as Autistic Spectrum Disorder[17] (ASD), dyslexia and an attention disorder (AD). Whyte (2006) lists various qualities which she feels researchers with children with special needs should have. I already possessed some of the qualities or qualifications Whyte felt were necessary – I had experience of working with children with some of these special needs, the ability to communicate with them and knowledge of the physical and cognitive impairments and their likely impact on children. To ensure that I was up-to-date with this knowledge I interviewed the SEN key worker (Appendix 11) for the participant with ASD to ensure that I understood the impact and extent of his autism and how it might affect both him and my research. This participant was able to communicate and interact with a wide range of people despite impairments with socialisation and some repetitive patterns of behaviour. With the dyslexic and AD participants, I interviewed their form tutors. Harcourt et al. (2011) encourage researchers to use multi-media methods to facilitate children with special needs ability to express themselves. I incorporated audio and video recordings as well as informal chats and interviews with this in mind. My data analysis was likely to

[17] The term Autistic Spectrum Disorders (ASD) refers to a wide continuum of associated cognitive and neurobehavioral disorders, including, but not limited to, three core-defining features: impairments in socialization; impairments in verbal and nonverbal communication; and restricted and repetitive patterns of behaviours. While some children with ASD have very severe communication difficulties, others with ASD can communicate and interact effectively with a wide range of people. (Filipek et al, 1999)

have been influenced since the engagement in learning of the participants named above would have been affected by their additional learning needs.

3.2.3 Ongoing consent

In the preliminary stages of my research the school management team at my case study school were happy for me to communicate solely with the members of staff who organised *Minecraft* Club and English Intervention classes, my principal research sites.

However, later in the study, when undertaking more in-depth research with the five core participants, I met with senior members of staff responsible for safeguarding and pastoral care and provided them with an information sheet (Appendix 9) about the nature of the continuing research. This required observing lessons on five days, one day for each participant. The school obtained verbal consent from the teachers of those lessons for me to observe the core participant in their lesson.

At this stage since I also intended to elicit audio recordings, make video recordings and take photographs of the core participants I needed to obtain parental consent. I asked the school to send home a letter, information sheet and consent form (Appendix 6) which was returned to the school when signed. I stored all of these forms securely after copies were taken by the school.

All other teachers and support staff who took part in the research were given a similar information sheet and consent form to the *Minecraft* Club teacher which outlined the scope of the research and what was expected of them. Signed paper copies of all the consent forms were held securely in a locked cupboard for the duration of the research study.

3.3 Settling on a case study site

In the preliminary stages of my research, I selected three secondary schools in South Yorkshire as field sites (Table 1), choosing schools from a range of locations, socio-economic backgrounds, OFSTED gradings and ethnic composition and with whom I had worked as a Digital Education consultant The measure of social disadvantage used (Table 1) is the percentage of pupils on free school meals.

School pseudonym	Location	Free School Meals	Main Ethnic Group	OFSTED Status	School type[18]	Special Ed Needs
Southwood	Small mining community	47%	White British	Special Measures	Multi-academy chain	10%
Palmers	Affluent, rural setting	11.5%	White British	Good	LEA 'Grammar' School	1.4%
Roughton	Suburbs (Rotherham/ Sheffield)	31.5%	Multi-Ethnic	Good	Single School Academy	1.1%

Table 1 Demographic details of schools participating in study

This initial data, particularly the teacher interviews, led me to believe that some multi-academy trusts had instigated institutional cultural practices which were more restrictive than non-academy or elective academy chain schools and that these restricted practices might be contributing to a clash of cultures between students' out-of-school learning practices (particularly digital and gaming learning practices) and those in the classroom.

School pseudonym	Teacher interviews	Lesson observations	Photographs
Southwood	3	5	26
Palmers	3	3	15
Roughton	4	11	30
TOTAL	**10**	**19**	**71**

Table 2 Data gathered in initial sample schools

[18] Explanation of school types in UK https://www.tes.com/news/types-of-school-in-uk and further explanation of 'academy' schools https://www.gov.uk/types-of-school/academies

Lesson observations and interviews with staff in schools and photographs of signage emphasising standard outcomes and practices shown in Figure 5, appeared to confirm this tentative conclusion.

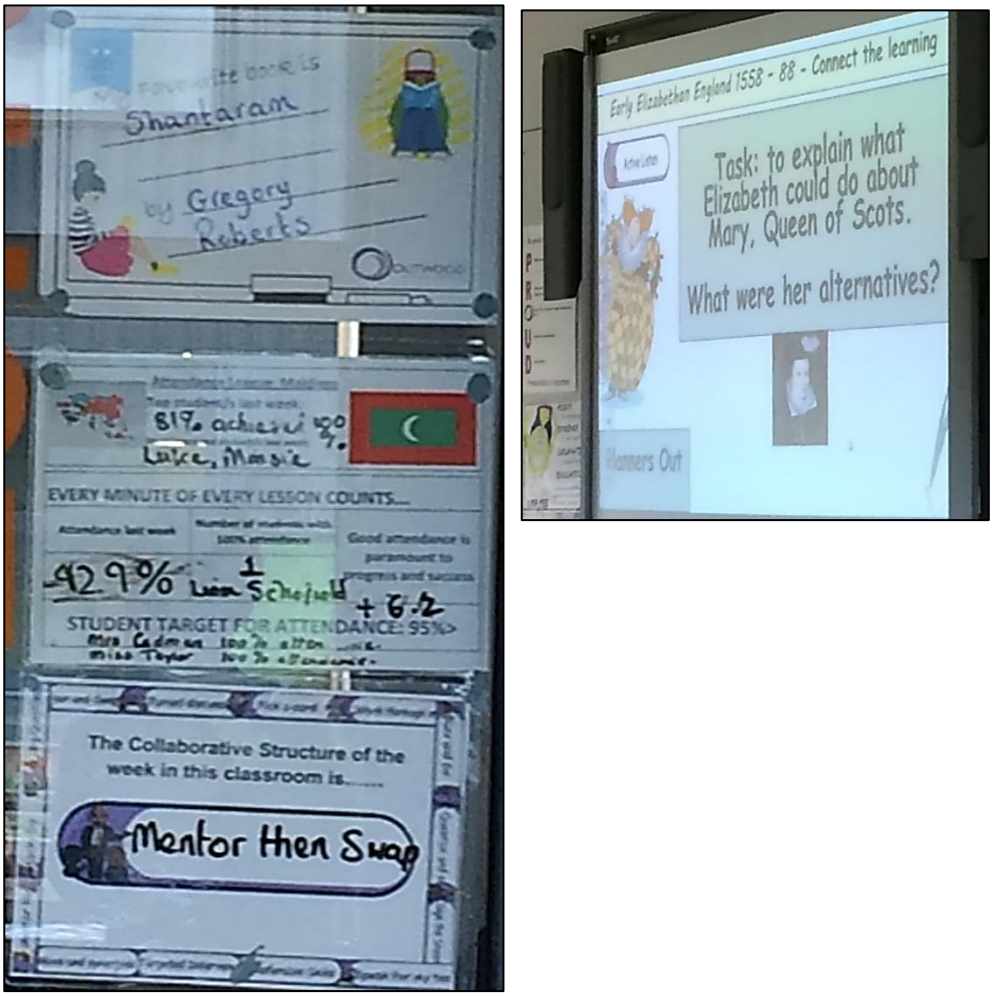


Figure 5 Standardised classroom signage/PowerPoints for lessons

However as already mentioned, I became convinced that a sociomaterial ontology, which included both social and material elements of disengagement and considered the part that spaces and spatial practices were playing in producing it, would produce a more satisfactory way of exploring disengagement rather than a focus on individual human behaviour and psychology. My epistemological perspective altered, to become one where knowledge (and by association engagement) is emergent and performative. Jackson and Mazzei (2013) remind us that the

research assemblages necessary to undertake such an exploration are not spontaneous but 'machines designed to do specific tasks…' (p. 263) and composed of a limited number of relations and affects. My task was to assemble data collection techniques which would best achieve my aim of generating a body of evidence about the enactment of engagement and methods of analysis which helped disentangle the process of assembling engagement across a range of learning situations. Neither the schools nor the data collection I had undertaken to this point where going to enable me to achieve this. In the next section I explain the reasons for this and my solution.

3.3.1 Access

Because of my historical role as an educational technology consultant in my pilot study schools and prevailing negative perceptions of the IT company I worked for, it was difficult to negotiate the sort of open-ended access to everyday classroom practice which would be required to generate data based on a sociomaterial approach. These negative perceptions were based on historical decision-making made around the time of the Building Schools for the Future (BSF)[19] programme in England. At the time my research began in 2014 many English schools had what is referred to as a 'managed service' for their IT equipment and services, usually negotiated by local education authorities, without consultation with individual schools. Services were offered by large IT companies, often more equipped for businesses than educational institutions. Contracts were frequently restrictive (limits on number of technicians, hardware, Service Level agreements etc) and imposed by Local Education Authorities (LEA) for time periods of up to 5 years. My former company employed a team of 'e-learning consultants', all ex-teachers, who were supposed to help schools adopt appropriate

[19] BSF – Building **Schools** for the Future (**BSF**) was the name given to the British government's investment programme in secondary **school** buildings in England in the 2000s. https://en.wikipedia.org/wiki/Building_Schools_for_the_Future

technology to align with pedagogic practices and newly designed school buildings. The LEA had a strong input into the form of this e-learning support, however, and often imposed technological tools they felt were 'desirable' for schools to be adopting. An example of this was that the first few months of my contract involved me building online learning sites in Microsoft Office 365 (which has now become Microsoft Teams), which at the time was ill-suited for education, difficult to use and with virtually no specialist educational tools. The sites I built were largely online storage for documents.

In the latter stages of my employment with this company, as the restrictive contracts were nearing their end, the e-learning consultants were beginning to work more independently with schools, offering them more bespoke advice, helping them to 'audit' their own practice and develop their own strategies. However, despite this change of focus most schools did not remain with this 'managed service' solution at the end of the five-year period and my post ceased to exist.

Despite my no longer working for the IT company, the adult participants at the schools in which I had worked did not regard me as a fellow teacher but rather as an 'IT expert'. My direct contact with students during my time as an e-learning consultant had been very restricted and the students regarded me in a similar way to their teachers. When I approached student participants for this study therefore, they did not regard me as a 'gamer' since my initial contact with them was formally negotiated through teachers and I had presented myself as a researcher. Consequently, students were reluctant to 'hang out' and share their gaming experiences with me.
After the first round of data collection (p.78-79) I knew I needed to re-think my strategy to achieve the necessary informal presence or co-presence to 'hang out', immerse myself in the setting and collect the data necessary for my sociomaterial approach. Therefore, I devised a plan to re-approach students in the context of school gaming clubs in order to create this informal co-presence, at least in the club, in online games and later, classroom encounters. Although two of the schools in my initial sample had such

gaming clubs, as discussed, my prior history with them meant that this new strategy did not bear fruit. Neither of the teachers who ran these clubs in Southwood or Roughton responded to my request to work with them.

I therefore approached a fourth school (School E), which had also been part of my former IT company's customer base. I knew this school had a lunch time *Minecraft* Club. Since I had not worked with School E whilst an e-learning consultant they had no pre-conceived ideas about me and I was able to approach them through my partner who worked there in the role of IT Network Strategy Manager. Although the selection of this school could be seen as 'opportunistic sampling' (O'Reilly, 2009, p.7), it was strongly led by the demands of my research, in this case the need for a gaming club in a secondary school setting, rather than purely convenience. Snowball sampling (ibid) starts with a small sample of initial contacts, as I did, and then those contacts snowball the sample out to individuals such as my partner, who knew and could introduce me to the teacher who ran the *Minecraft* Club at School E. Similarly, when selecting the core student participants for this study I used my initial contacts in the *Minecraft* Club as a starting point – this is discussed further in Section 3.4.4.

Once I had been introduced to the *Minecraft* Club teacher and had an informal chat with him about the aims of my research, I sent an information sheet (Appendix 9) to the Senior Management Team of the school, outlining the purpose of the research, my requirements in terms of participants and a research schedule with a rough outline of dates and time periods for data collection.

3.3.2 School E

School E is a larger than average (1714 pupils) secondary school in South Yorkshire, England. Most of the students are from white British backgrounds

and the number of pupils on free school meals is 27.5%, which is considered below average (see Table 1). However, the number of pupils with disabilities and/or special educational needs is above average (OFSTED School report, 2017) and the school also hosts a hearing impairment unit for the local education authority. Recent GCSE results have been below the national average and in January 2017 the school was graded Inadequate by OFSTED. The OFSTED 2018 report mentioned specifically, that in order to improve, teachers needed to consistently provide 'challenging and engaging activities in lessons and homework' (p.2) and that 'pupils do not engage well with their learning' (p.5).

Access to different areas of School E arose organically - my approach was to blend into the normal activities of the school as much as possible – as Geertz (1998) refers to it, a kind of 'deep hanging out' as discussed in section 3.3.3, p.86. Six months prior to the main data collection period (Feb – Nov 2017) I had been employed briefly at School E as an examination invigilator. This enabled me to gain some insight into the staff, students and organisation of the school before my negotiated access as a researcher as well as allowing staff to become familiar with me on an equal basis, as fellow staff member. Through my weekly attendance at *Minecraft* Club and my work with the English Department on *Minecraft*-related lessons I was able to spend at least a couple of days a week in the school, until I was on first name terms with most of the reception staff and several teachers.

As I got to know the school I began to get a 'feel' for the culture of the school and its ethos, which although stated on the website, was communicated through the surroundings, the routines and rituals and the staff and student relationships. The annual sponsored walk was an example of an activity that I was invited to take part in and was able to observe first-hand. It occurred about mid-way through my research, after a discussion between myself, the Head of Extracurricular Activities and the Deputy Headteacher, about extra-curricular activities and relationships with the local community. They mentioned a recently re-instated tradition, an annual walk in which the

entire school community (1714 students, plus teachers, support staff and parent volunteers) took part to raise money for local community organisations and other nominated charities which the students voted on. They all felt that attending the walk would give me a real insight into the school, its culture and how it related to the local area.

The walk began in the school grounds, with the route taking participants around the local area in a circle, ending up back at the school later in the afternoon. Each year group set off at staggered intervals with a team of teachers, support staff and volunteers, mainly parents of students. I was asked to walk with my partner and the Year 8 group of students (200-300 students). Students were excited and good-natured about this opportunity but what particularly struck me was the positivity of the local people on the route. Many people came out of their houses to offer words of encouragement or just chat or shout to children and adults they recognised. It was clear that the school played a positive part in the local community. Students walked along with us, chatting in a comfortable and relaxed manner. When our little group got lost at one stage, we were reliant on the students since neither I nor my partner lived in the area and were completely unfamiliar with the route. We did have a map, but the students were much better at interpreting it. This experience helped to support my role as researcher and 'interested friend' as many students had seen me taking part in this community activity. In the next section I discuss the researcher role in more detail.

3.3.3 Researcher role

Conventional ethnography considers the role of the researcher from the position of either an insider or outsider. Thomson and Gunter (2011) point out that this binary is still dominant despite having been challenged by sociomaterial researchers such as Fenwick and Edwards (2010) who argue

that the researcher's positioning is not 'given and static' (p.162) but constantly being re-formed in the course of conversations, observations and so on. Thomson and Gunter (2011) describe their own school ethnography as being made up of 'messy, continuously shifting relationships' (p.3) but attribute this to a notion of 'liquid identities' (p.2), implying the continuing centrality of the human subject, the researcher, in the research process. Dwyer and Buckle (2009) suggest, similarly to Mol (2002), that it is possible to inhabit both positions simultaneously, in what they call a 'liminal space'. Although they acknowledge the overly simplistic manner of the insider/outsider debate, they still maintain the supremacy of the researcher's knowledge, which they say, is based on his or her positionality. Engagement, in their eyes, therefore, would be a concept or object which is 'knowable' to and discoverable by the researcher. Contrary to these discussions, within a new materialist approach the assumption is that the researcher is already inside and inherent to the assemblage, albeit in a position of privilege within the actor network (Fenwick and Edwards, 2010) making the question of insider or outsider roles irrelevant (Schadler, 2019).

Like Schadler (2019) other sociomaterial ethnographic accounts raise the issue of the researcher role (Landri, 2013; Taylor, 2009; Niemimaa, 2014) and their position within the research. If the researcher is already inside and inherent to the assemblage of engagement, my preferred strategy of 'deep hanging out' (Geertz, 1998) and indeed, 'hanging out' (discussed later in this section) would seem to align with the principle that the researcher is entangled with the materiality of the research site and not at a distance from it, as the word 'role' would imply. This strategy allows agency and affect to be manifested in multiple ways. Although Fenwick, Edwards & Sawchuk (2015) suggest that human actors are disproportionately capable of altering relationships with other actants within assemblages they do not suggest that it is necessarily the researcher who is responsible for this. Niemimaa (2014), however, acknowledges the researcher as an active agent within assemblages and discusses the accountability of the researcher for their work practices and the consequences of those practices in the process of

becoming. This suggests that there should be some consideration and concern on the part of the researcher about the different enactments of the ethnographer's presence which may be shared between virtual and face-to-face encounters (Landri, 2013).

I had multiple identities resulting in different enactments of research: as a fellow teacher, a gamer, an academic and an educational technologist. As a researcher I had begun my study by identifying a concern, that is disengagement from formal learning and arranged to 'hang around', engaging in observation, collecting notes and asking questions (Macleod et al., 2019). This strategy to become part of the research assemblage by 'hanging out' has already become an accepted part of ethnographic studies particularly with young people (Ito et al., 2008), alongside a similar strategy called 'deep hanging out' more associated with organisational ethnographies (Geertz, 1998). I wanted to take part in the normal activities of the school as much as possible – as Geertz (1998) refers to it, a kind of 'deep hanging out'. The term 'deep hanging' out is not well articulated but is described by Walmsley (2018) as 'the fieldwork method of immersing oneself in a cultural, group or social experience on an informal level'. I wanted to be regarded as part of the normal life of the school.

With the students I wanted to take a slightly different approach, to explore their gaming habits in an informal manner. This term 'hanging out' is used by Ito et al. (2018) to describe how youth participate in their given social networks as a kind of informal maintenance of continuous presence or co-presence in multiple contexts, on and off-line. It is a much looser term, which unlike 'deep hanging out', does not require total immersion or acceptance by the social group, just tolerance and intermittent ability to participate in activity.

3.3.3 Case study research sites

Within School E I collected my data from four main research sites:

- *Minecraft* Club (Wednesday lunchtimes – Feb – Nov 2017)
- English Intervention *Minecraft* lessons (March – April 2017)
- 'Day-in-the-life' classroom observations of core participants (selected from *Minecraft* Club members – Table 6 p.115)
- Informal game play of core participants in home environments.

Research site	Research period	No of participants	Types of data collected	Quantity of data
School E *Minecraft* Club	Wednesdays 1.00 – 2.00 Feb – Nov 2017	15-25	Video/audio recordings Observations Photographs Field notes Informal chats (recorded) Interviews	3 12 13 12 8 6
English Intervention classes	6 weeks Mar – April 2017	12	Interviews Observations Photographs Audio-recordings	6 6 2 4
Classroom observations (core participants)	Oct – Nov 2017	6	Field notes Observations Photographs	20 20 125
Home game play sessions	Oct – Nov 2017	3	Audio recordings Screenshots	3 17

Table 3 Main research sites

In addition to the research sites specified in Table 3, the entire school environment, the school buildings, playground, staffroom and so on, was also a research site. Data were collected in the wider whole-school setting

through interviews with pastoral staff, the school librarian and the Director of Extra-curricular Activities (Table 9) and activities such as the sponsored walk as mentioned in my discussion about access. Photographs were taken of corridors, displays and noticeboards and outdoor areas (Fig 17-18, p.120-121) in order to produce accounts of school practices, ways in which reality was enacted (Oliver, 2012) and to identify school 'modes of existence' (Decuypere and Simons, 2016).

3.3.4.1 *Minecraft*

The sandbox video game *Minecraft* was a major element in the research sites listed above. It was created by Swedish game designer Markus "Notch" Persson in 2011 and published by Mojang, a company he founded. In sandbox games the player has been freed from the traditional video game structure and direction, and instead chooses what, when, and how they want to approach the available content. In some sandbox games players can also create content, in a constructionist process that some, such as Papert & Harel (1991) call 'learning-by-making'. The key word in these games is autonomy, the ability to develop your character (in some games) and there is often no concrete goal or end to the game. The term 'sandbox' refers to a child's sandbox, without rules, with play based on open-ended choice.

This open-endedness is particularly important for students with learning difficulties such as dyslexia and attention disorders, such as Autism Spectrum Disorder (ASD), with whom accommodating multiple learning styles is important, giving them the freedom to explore things which motivate them in greater depth and also providing assignments which allow such students to show their strengths (O'Sullivan et al., 2017). As I have outlined in Section 3.4.1 (Table 4), three out of my five core participants had such special needs. I have discussed the educational merits of *Minecraft* itself in more detail in

the Literature Review Section 2.4.

Minecraft's basic activity revolves around players building things with a variety of different 'blocks' in a 3D world. There are several gameplay modes, the two most popular being survival and creative modes. In survival mode (the default mode) the player needs to acquire resources to avoid dying either by being killed by monsters or of starvation. In creative mode the player has unlimited resources and the ability to fly. The PC version of the game attracts a lot of 'modding'[20] where players can create new gameplay mechanics, items and assets for the game. The participants in my study largely played Creative Mode and were concerned with building, programming, modding and running their own *Minecraft* servers with friends.

Prior to the buy-out of *Minecraft* by Microsoft in 2014 in there were two main versions of *Minecraft* - the commercial PC version produced by Mojang and an education version, *Minecraft*Edu[21], specially for schools, which was developed in a partnership between Joel Levin, an American school teacher and a Finnish company called TeacherGaming.

The students at the *Minecraft* Club in my case study school were playing an older version of *Minecraft*Edu (described in the previous paragraph) on their own server, which had been set up by the IT technicians in the school on a dedicated PC and was run by a group of students, with the teacher's support. *Minecraft*Edu is now called *Minecraft* Education Edition and has recently been re-launched through the Microsoft Office365 platform. To avoid confusion, I have referred to the original TeacherGaming version as *Minecraft*Edu and to the newer Microsoft version as *Minecraft* Education

[20] Modding (or 'cracking' as it was originally called, referring to the idea of cracking open a game's source code) had slowly started appearing as early as the '60s and '70s. https://www.techradar.com/uk/news/skins-smurfs-and-skyrim-a-brief-history-of-pc-modding
[21] *Minecraft*Edu (original version) https://*Minecraft*.gamepedia.com/Mods/*Minecraft*Edu

Edition throughout. The main difference between the commercial version of *Minecraft*, which can now be played on PC, Xbox and tablet, and the two education versions, *Minecraft*Edu and *Minecraft* Education Edition, is that the education edition has tools for teachers which allow them to have control over gameplay in the classroom.

The teacher can track students, talk to them, freeze gameplay whilst they discuss things with students, give out resources as required by the task etc. There is a tutorial world, a mini-map for navigation Figs 6 & 7), a screen capture tool and a portfolio for students to keep a record of their *Minecraft*

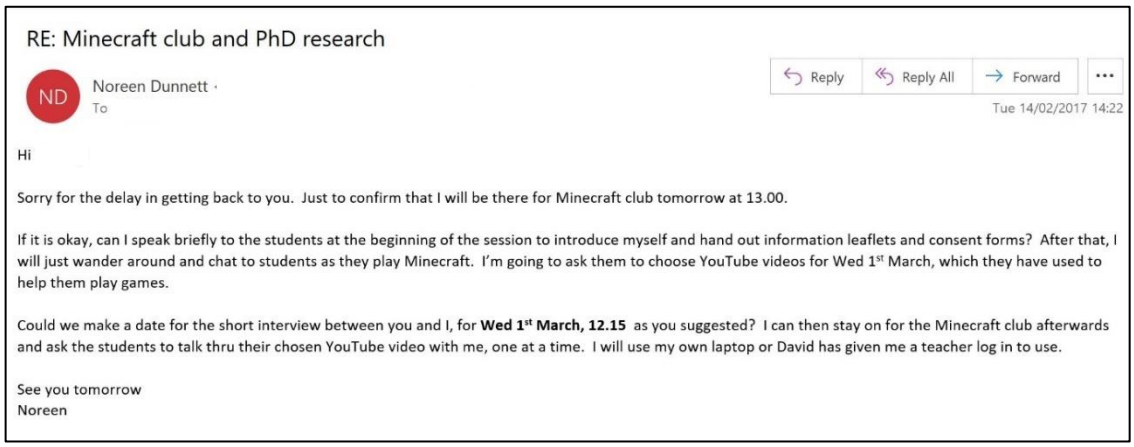
Figure 6 Minecraft Education Edition: view of tutorial world

Figure 7 Minecraft Education Edition in-game portfolio

activities for the teacher to look at. At the time of the research, this version was not available to either the students in the English Intervention lessons or the *Minecraft* Club members. English students played *Minecraft* Pocket Edition on iPads, which was the commercial version available at that time for tablets and mobile phones. *Minecraft* Club members played an older version, *Minecraft*Edu, described in previous paragraphs.

3.3.4.2 *Minecraft* Club - constructing a research site

Minecraft Club was a lunchtime activity organised by a teacher in the Information Technology and Computing department as part of the school's Extracurricular Activities programme (more details see Appendix 2).



RE: Minecraft club and PhD research

ND Noreen Dunnett
To

Reply | Reply All | Forward | ...

Tue 14/02/2017 14:22

Hi

Sorry for the delay in getting back to you. Just to confirm that I will be there for Minecraft club tomorrow at 13.00.

If it is okay, can I speak briefly to the students at the beginning of the session to introduce myself and hand out information leaflets and consent forms? After that, I will just wander around and chat to students as they play Minecraft. I'm going to ask them to choose YouTube videos for Wed 1st March, which they have used to help them play games.

Could we make a date for the short interview between you and I, for **Wed 1st March, 12.15** as you suggested? I can then stay on for the Minecraft club afterwards and ask the students to talk thru their chosen YouTube video with me, one at a time. I will use my own laptop or David has given me a teacher log in to use.

See you tomorrow
Noreen

Figure 8 My email to Minecraft Club teacher

The club took place every Wednesday lunchtime between 13.00 – 14.00 in one of the Computing classrooms (Fig 9).

I began this process through an informal visit to *Minecraft* Club. This was followed up by an email (Figure 8) and an information sheet explaining my aims and laying out a proposed timeline for the research. I asked *Minecraft* Club members to fill in an online survey (Appendix 3) in order to collect some

key information quickly. I was keen to know what kinds of video games the club members played, technology they were comfortable using (e.g. creating video, making recordings) and their interests so that my face-to-face contact could be more productive.

Figure 9 Computing classroom - School E

The teacher set up the club for students interested in *Minecraft* and coding. A version of *Minecraft* hosted on a third-party website which dealt explicitly with coding was being used. Most of the students who attended the club early in the research period were students interested in coding. However, once the club had its own *Minecraft* EDU server set up the nature of the club activity and the students who attended did change. Students were not directed in any way during the club – the teacher 'supervised' the room but students were free to engage in whatever *Minecraft* activities they liked. This resulted in a range of activity from programming, building in creative mode to playing PVP (player versus player combat). The informal and social nature of these practices may partially explain the level of comfort students felt in chatting informally to me about their game play and my ability to 'hang

out'. It was this element, which had been lacking in the schools in my initial sample, which made it possible for what Sørensen (2009, p.35) calls 'a heterogeneous research object' to be constructed.

The 'hanging out' strategy depended on my student participants regarding me as a 'peer' in the gaming space ((Ito el al, 2008). I had had some experience of this with my nephews with whom I had played *Minecraft* and Clash of Clans[22] and with adults on an online MSc in Digital Education. In the first case my personal relationship with my nephews and the fact that the gameplay took place in our respective homes meant that it was accepted that we were all 'playing' together for the same reason – fun.

> Nephew: Then join our clan - you have to attack first - just keep holding it down until it says zero troops, yeah
>
> Me: Right, what's happening?
>
> Nephew: That's cos you're getting loads of coins
>
> Me: Awesome! Ok, return home - now which clan shall I join?
>
> Nephew: Should say. Oh, first you've got to say what your name is
>
> Me: My name is...
>
> Nephew: Don't put your real name…….
>
> (Extract from audio recording during gameplay with nephew, Nov 2016)

In the second case, my relationship with the adults on the masters course was as a fellow academic, interested in game play – the course and my relative expertise gave me acceptance as a 'peer' in terms of the educational benefits of *Minecraft*. Establishing my credentials as a 'peer' with 11-13-year olds with whom I had no personal relationship was somewhat

[22] Clash of Clans - https://en.wikipedia.org/wiki/Clash_of_Clans

more difficult.

To accomplish credibility as a 'gamer', which I had been lacking previously, I bought an Xbox One and began playing a range of popular commercial games regularly (Assassin's Creed Syndicate, Forza, Inside[23], Clash of Clans etc), some of which interested me personally and some which were popular with the age group I was working with. I was already very familiar with *Minecraft*, the use of which is prevalent in schools (see further explanation in preceding section). I had, therefore, somewhat addressed one of my earlier problems, that of not being perceived as a fellow 'gamer'.

After the informal visit, to assess the suitability of their lunchtime *Minecraft* club for my data collection, the teacher and I agreed that I would attend the *Minecraft* club once a week over a period of six months. I asked him to read the Teacher Information Sheet and sign a consent form (Appendix 4). I explained that I would want to interview him at least once about his views on disengagement and game-based learning. I would also want to 'chat' to students about their gaming and *Minecraft* and might occasionally take some students to a more private space to record these chats (which varied between 7 – 20 mins). The eventual aim was to select 4-6 students with whom to work more closely. These would be students who were interested in working with me, members of *Minecraft* club and a percentage of whom the teacher would identify as 'disengaged'. I planned to observe the selected students in a formal classroom setting as well as in *Minecraft* Club. During my first official visit to the club I briefly introduced myself and the research to students and handed out information leaflets and consent forms (Appendices 5 and 5a)

On my first visit to the club I consciously dressed in leather jacket, jeans and Dr Marten boots to emphasise my 'gamer' identity. I was keen not to be

[23] Assassin's Creed Syndicate – action adventure game set in Victorian England, with two assassins pursuing a series of missions. Published by Ubisoft, Montreal
Forza – a car racing game published by Microsoft Studies
Inside – puzzle-platformer adventure game published by Playdead.

taken as another 'teacher' or official visitor such as an OFSTED inspector, since students were more used to adults in these roles visiting them during school activities. When I arrived, the teacher introduced me by my first name (again, highly unusual with official adult visitors) and let me introduce my project. I explained that I was a gamer, outlined some of the games I played and why I liked *Minecraft* and that I was interested in hearing their views, watching them play and working more closely with some of them to compare their gaming experiences with their classroom experiences. I also told them about my work with students at the University of Edinburgh, playing games and exploring *Minecraft*. I mentioned that if anyone was interested in working with me, they should let me know and I would give them an information leaflet and consent form to sign. Eleven students approached me for the information and signed the form.

The atmosphere in the club room was very informal with students wandering in and out as they wished. There were few rules – students had to be playing *Minecraft* and were not permitted to eat their lunch in the room (due to the hardware in the room). Other than keeping a rough register, enforcing these two rules and ensuring that new members knew how to log into *Minecraft*, the teacher took no part in the activities. This meant that I was the only adult in the room who was an experienced *Minecraft* player. Consequently, over the months in which I attended the club students tended to come to me for help or to share their activities or creations. However, during weekly sessions, students were as likely to help me as for me to help them. There were three memorable incidents – helping me log in to the club *Minecraft* server, helping me craft in a Survival game (a mode of the game I had not experienced at that point) and helping me to escape an underground location.

On the first visit I walked around the classroom and sat down next to students to watch their gameplay. There seemed to be a large range of activities taking place - some were coding, using server controls and doing sophisticated work, others were just building and running around in the

Minecraft environment annoying fellow players. There also seemed to be a wide range of familiarity with *Minecraft* – some expert and experienced players and some relative beginners. I tried to talk to as many club members as possible on this first visit. I asked them questions about their activities and shared my experiences with them, sometimes asking them for advice. Many of the club members were only casual players, taking advantage of the club to pass the time over the lunch break. However, three students (two of whom were running the *Minecraft*Edu server for the club) were very interested in talking to me, promising to show me the YouTube channels and videos they had made, during my next visit the following week. I seized on this opportunity to ask other students about *Minecraft* on YouTube, both watching others and posting their own videos. This formed the basis of my informal chats in later weeks.

Over a period of several weeks during which I had chatted and interviewed a group of around 10 club members and after a discussion with the teacher, a small group of male students who had been 'founder' members of the club started to emerge as likely candidates to focus on for the second stage of my project, as referred to earlier, an example of snowball sampling. In the second stage I intended to spend a day with each participant, accompanying them to all their lessons and immersing myself in their experiences of formal learning activities. Full details about these observations in Section 3.5.1 p.113.

3.3.4.3 English Intervention Classes

A few weeks after my contact with *Minecraft* club, I contacted the Head of English at the school to ask if she would be interested in using *Minecraft* as a stimulus for writing within their existing curriculum. This was something I had experienced as part of my role as an e-learning consultant with an English class in another school in the area which had been very successful.

However, the teacher in that school was an experienced *Minecraft* player and had initiated and organised the *Minecraft* lessons himself. Although this was not the case in School E, I hoped to be able to observe the experience of playing of games within a formal learning situation in the classroom in order to compare it to *Minecraft* Club.

After meeting the Head of English, she referred me to a more junior member of staff, Ruth (pseudonym) who was responsible for planning a series of intervention[24] lessons for Year 7 (11-12-year olds) students who had been getting low scores in internal tests for writing. I met with her in February 2017. Since I remembered well the day-to-day pressure teachers were under and also because I hoped that teachers would see me as a colleague, I offered to design a set of lessons (Appendix 7) around the *Minecraft* game to encourage and engage students in writing for various purposes such as instructions, descriptive writing and interviews. Unfortunately, because of the very time pressures I have just referred to, I was not able to have any further face-to-face conversations with the teacher about the form these lessons would take, prior to them beginning in April 2017.

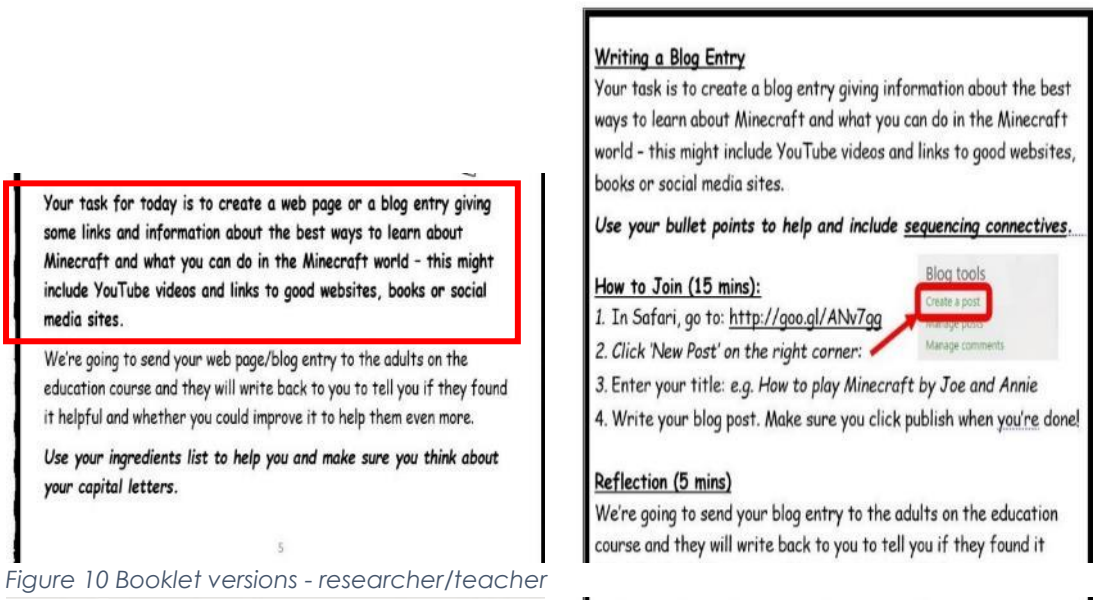


Figure 10 Booklet versions - researcher/teacher

[24] Intervention lessons - The Government made a commitment to provide additional funding to schools for each Year 7 student who did not achieve the Expected Standard (ES) in the Key Stage 2 national curriculum tests in reading and/or mathematics. The purpose of this funding was to enable schools to deliver additional support, such as individual tuition or intensive support in small groups, for those students that most need it.

With prompting by email, she sent me the existing lesson booklet and asked me to design my lessons with this template. I sent my new booklet version to the teacher for final 'tweaks'. Some of these changes were interesting, two in particular as can be seen in Figure 10 – the re-instating of underlined titles and the removal of my suggested structures for student blogs which I have highlighted in the red square.

After I had adapted the booklet (with the considerable restraints of this existing template) I sent it to the teacher for approval. She made further amendments such as those shown in Figure 11 (RH) on the next page. My version of the story-writing task (Fig 11, LH, red box) emphasises blogging, storyboarding, use of screenshots and video of *Minecraft* builds – an approach with more focus on technology and *Minecraft*.

The teacher's version emphasises handwriting (indicated by the blank lines below the picture) and grammatical structures e.g. ISPACED which is a mnemonic to remind students to include:

I – ...ing words - running
S – Simile
P – Preposition
A – Adverbs
C – Connectives
E – Ed words - shocked
D – Dialogue

The implications of such differences in terms of constraints and affordances for students are discussed in detail in Section 5.1.1.1 p.216.

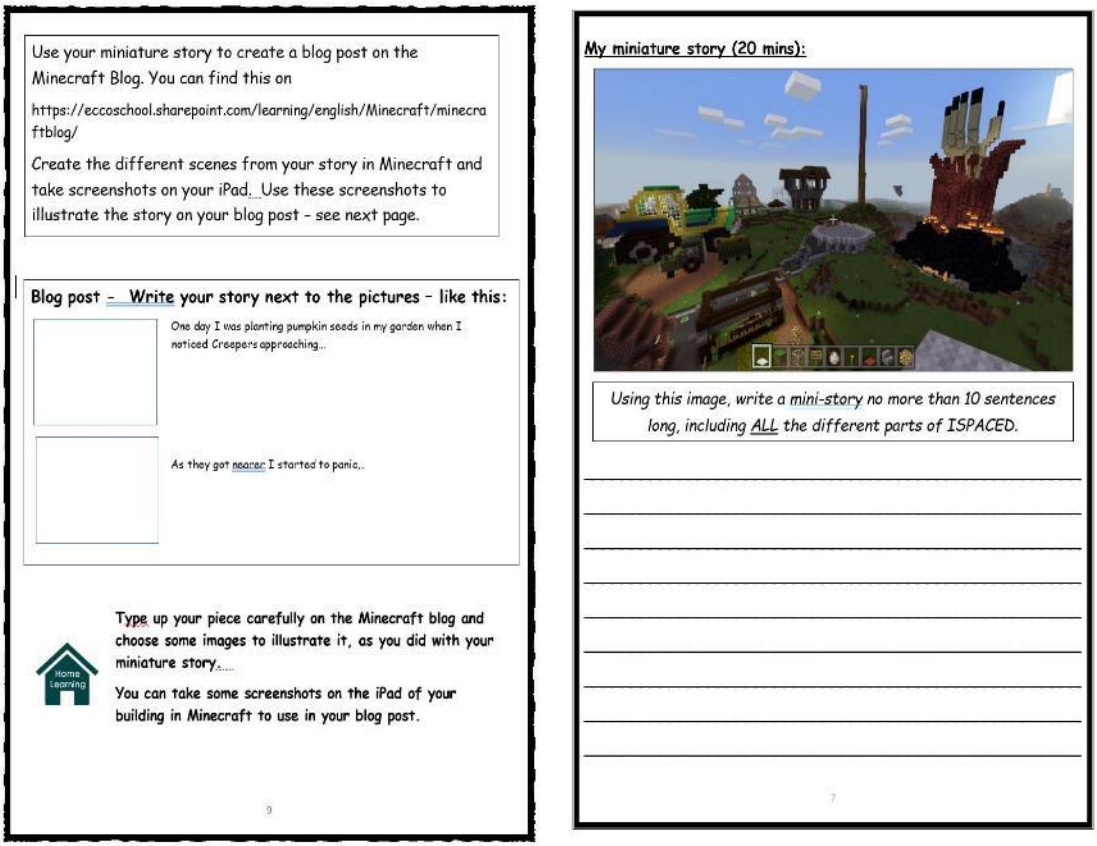


Figure 11 Story scaffolding - researcher/teacher

Lessons commenced about 4-5 weeks after the initial meeting between the teacher and myself and a more in-depth interview I had with her about engagement in English classes (Appendix 11). The Intervention lessons, for which the booklet was produced, were timetabled three times a week over a six-week period, largely with cover teachers and members of staff who had non-contact time. The rooms used for these lessons were those which happened to be available in these lesson slots and ranged from Design and Technology specialist classrooms to seminar rooms, staff work rooms and so on. The lack of specialist English staff and rooms and transparency about why students were taking part in the Intervention classes all militated against their success, as I discuss in Section 5.2.1.1, p.225.

An excerpt from a field note during this period expressed my own feelings:

> I have observed…that writing is paramount and valued as an activity - doing and speaking is not. There is an admirable attempt to 'embed' functional English skills such as using connectives within practical activities, but they are all short, un-sustained activities with, ironically, reflections plugged in at the end of each activity. The short time allocated to such reflection renders them meaningless…
>
> The attitude of the children…has changed from excitement and anticipation to weariness and acceptance as they've realised that the 'intervention' is just more of the same kind of activity they presumably do in their normal English lessons. I'm not clear about why they have been selected for 'intervention' and what the activities we have designed will achieve in terms of their needs. The students are certainly not clear - either about why they are in the classes and what they are supposed to be achieving, other than playing *Minecraft*. The irony is that due to shortage of time, the activities they would probably have genuinely enjoyed - actual building in *Minecraft* - will be squeezed out…
>
> Field note, 24th March 2017

I followed one specific class (out of a total of four classes) and observed six of their lessons. Each student had their own iPad and could create their own *Minecraft* world to which they could invite fellow students. Students were instructed to work in pairs, with one student creating the world in which both would work. I also arranged five Skype interviews (one with each Intervention class) between school students and University of Edinburgh Digital Education Masters students[25] and interviewed a selected group of the students (from across the five classes) about their feelings of engagement based on the experience of using *Minecraft* in the classroom compared to their activities in normal English lessons.

[25] This activity was based on a series of lessons I devised – see Appendix 2 and discussion on the University of Edinburgh MSc in Digital Education course called Introduction to Digital Environments for Learning where the adult students had observed how much help children had given them as 'newbies' to the game.

3.3.4.4 Home game play

I wanted to understand whether the sociomaterial processes involved in game play differed out of the school context, therefore I also wanted to collect data from my participants' experiences of playing games at home, outside of the more bounded space of the school *Minecraft* club. As I had gained ethical approval only for working with students in a school context, it was not possible to observe the participants directly in their home environment, I had to re-construct these 'assemblages' myself, after the event, as described below.

I asked each participant to borrow a school hand-held audio recorder and to provide a commentary as they played a new game at home. Despite several requests, only three of the six participants provided this audio recording. One student misinterpreted my request, recording himself playing a multiplayer game of *Rainbow Six Siege* with his friends, rather than a new game. Another recorded himself playing a *Minecraft* mod[26] – the mod itself was new to him, but he was already an accomplished *Minecraft* player. Only one followed the guidelines and recorded himself playing a game called *The Turing Test*.

Audio recordings were not a sufficiently rich re-construction of my participants' experiences within the gaming assemblage; therefore, I supplemented their audio recordings with visual data in the form of screenshots from the respective games (Fig 13). For *Rainbow Six Siege* I used screenshots of game play available on the Internet. For *The Turing Test*, I downloaded the game and played through it myself, up to the same point as my participant and took screenshots to match his commentary in order to 'piece together' his gameplay (Fig 12).

[26] Mod (short for "modification") is an alteration by players or fans of a video game[1] that changes one or more aspects of a video game, such as how it looks or behaves. Mods may range from small changes and tweaks to complete overhauls and can extend the replay value and interest of the game. https://en.wikipedia.org/wiki/Mod_(video_games)

Dylan: So right now the robot (AI) talking to this girl and I think this girl's name...[4]

Now that looks really weird yep I am in outer space I wish you could see what I can see but I see stars and I think I'm next to mos..yeah I'm walking right now..right get me here a..[9] hey I'm looking at a computer right now says 'Error and weird numbers [19]

Game commentary: you've got EMT - its' on the side

It says something's on this side [26] I'm just seeing some random file that's not the docking sta::shun [5] docking bay [5] I am opening a finger seal [14] this looks actually looks quite nice [26] looking for nice? mice?

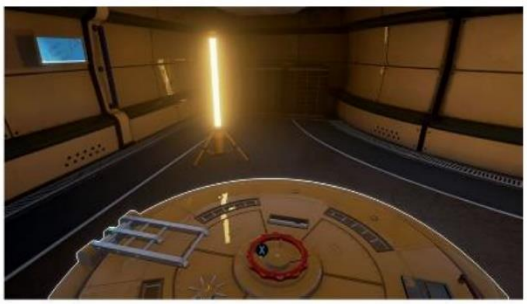


Figure 12 Screenshot reconstruction of home gameplay

It was not possible to do the same for the participant playing the *Minecraft* mod because despite repeated requests he was unable to identify the name of the mod and only provided me with two screenshots of the initial part of the game. Due to this lack of data I was not able to include an analysis of his game play alongside that of other participants as outlined in Section 5.2.

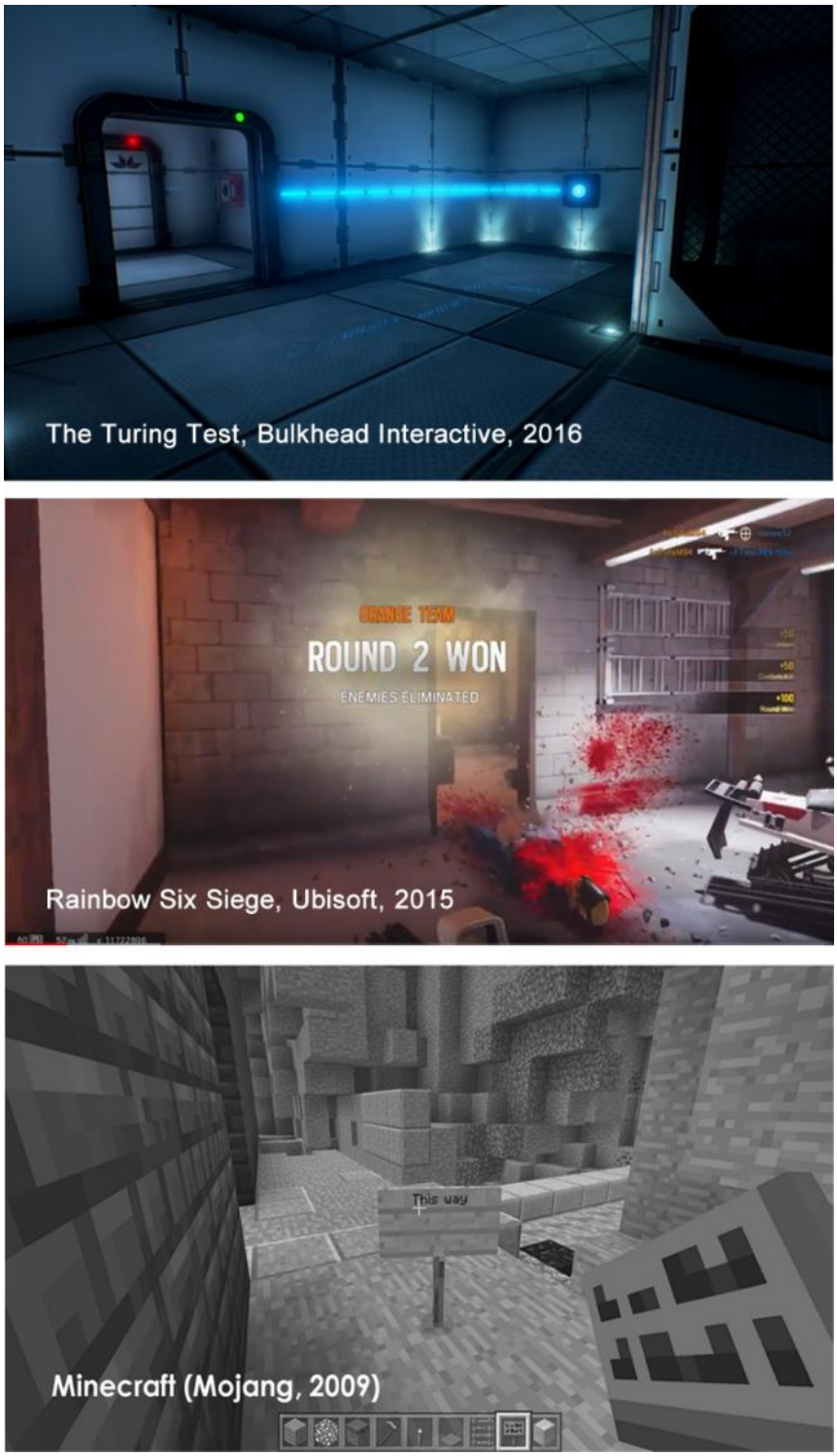


Figure 13 Screenshots of games played at home

3.4 Recruitment of participants

Similarly to Oliver (2012), my praxiological approach involved following specific actors – in this case, students – over a period of time, in order to understand the diverse forms of engagement and disengagement that they enacted, and then seeking to generate evidence about the diversity of enacted realities by involving other actors whose practices overlap with the students' such as form tutors, subject teachers, the *Minecraft* Club teacher, the school librarian and the Director of Extracurricular Activities (Fig 14)

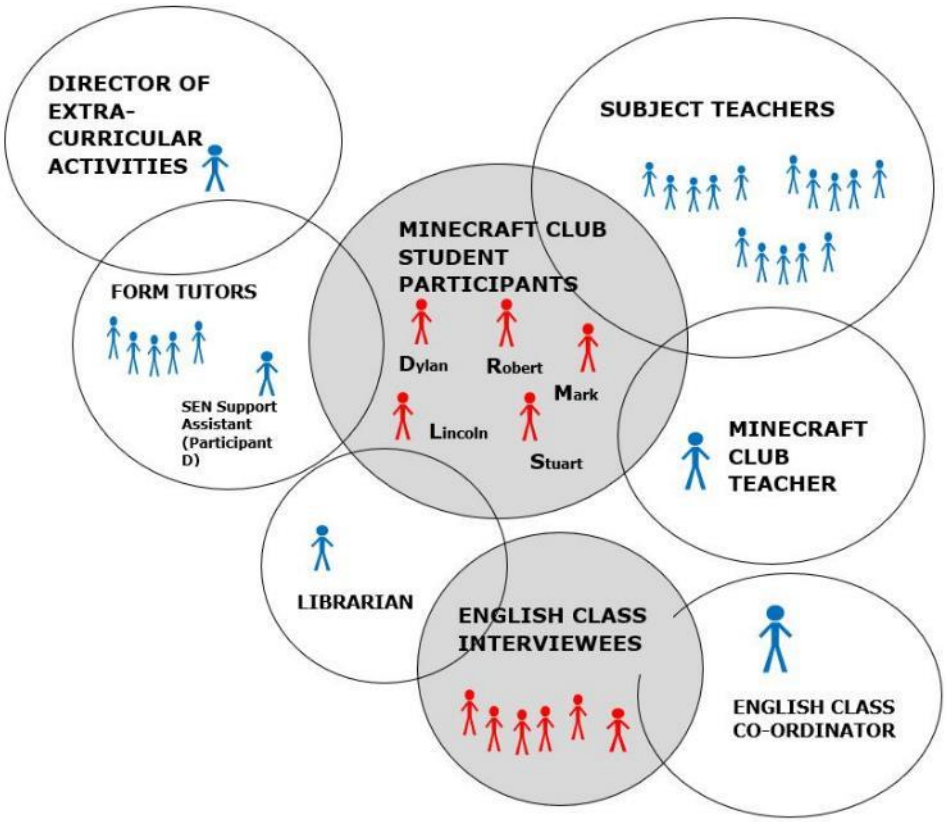


Figure 14 Research participants - overlapping relationships

All my student participants were drawn from the 11-13-year-old age group (Year 7-9) because statistics from the Department for Children, Schools and Family (DCSF) report (2009), stated that the majority of young people are already either engaged or disengaged in learning by the time they are in Year 9 and 13-14 years of age (Ross, 2009). This implied that up to Year 9,

disengagement is still an on-going process making this an optimum period to study enactments or assemblages of engagement. My five core student participants (my actors – see table 4, page 106) were recruited from one of two research sites – the lunchtime *Minecraft* club – or from English *Minecraft* Intervention classes (six students). The five core participants were followed over a period of 9 months within various situations, from *Minecraft* Club to lessons to their home gaming environments and a body of evidence was built up to generate a diverse set of enactments of engagement.

3.4.1 *Minecraft* Club student participants

As already discussed, during my first official visit to *Minecraft* club the teacher introduced me to the club members. I gave a short presentation to the club, explaining who I was and what I was interested in. Information leaflets (Appendix 5a) and consent forms (Appendix 5) were distributed.

At this initial meeting, during which the teacher was always present, 11 students (from a larger group of about 25-30) signed the consent form. To help me make a further selection from this group I asked students to choose a YouTube video they had used to help them with either *Minecraft* or another game they played regularly and be ready to discuss it with me the following week. The rationale behind this was to enable students to chat to me from a position of knowledge and power and for me, as the researcher, to be less knowledgeable but interested and engaged. This fitted into my research strategy which was based around Ito et al's (2008) idea of 'hanging out, messing around and geeking out' (p.10). I also hoped that this would distinguish the participants who were genuinely committed and interested in my research. Even before this planned session, three of the eleven students voluntarily chatted to me about their YouTube channels and videos they had made.

The selection process was based on multiple factors, with the teacher/supervisor of the club being one. He advised me that two or three of these students were considered 'disengaged' a label they had acquired from behaviour exhibited in some of their formal lessons.

Based on this information I was able to select five students, including the three whom the teacher had identified as disengaged from formal learning, with whom I felt I could hang out, who were also willing to talk to me and who seemed particularly involved with *Minecraft* club activities.

Student (names are pseudonyms)	**Year/Age group**	**Gender**	**Special Educational Needs**	**Level of engagement in lessons** (identified by *Minecraft* teacher)
Dylan	Year 9 (13/14 years old)	M	Autistic Spectrum	**Disengaged**
Stuart			Dyslexic	
Robert			Attention Disorder	
Mark	Year 9 (13/14 years old)	M	N/A	**Engaged**
Lincoln	Year 7 (11/12 years old)		N/A	

Table 4 Core participants in study

3.4.2 Participant characteristics

It should be noted that although Table 4 is a convenient way to display information about the core participants, self-identified labels such as 'dyslexic' under Special Educational Need are individual attributes, socially and materially constructed and not directly relevant within a relational ontology. However, it can be noted that the core participants in Table 4 are all male.

The lack of girls in the study was not a deliberate choice for this study. The ratio of boys to girls in the *Minecraft* club was variable but rarely more than about three girls from a total of 33 attendees. This immediately limited the number of females who could be recruited from the *Minecraft* Club. The few girls who did attend the club were very quiet and not very communicative or willing to articulate their feelings. Research suggests that gaming in male oriented environments such as the *Minecraft* club is 'not socially rewarding for females' (Schott and Horrell, 2000, p.39). Research also shows that girls tend to choose to play in their homes more than anywhere else. Indeed, Ito et al. (2008) noted that girls tended to be stigmatised more if they identified with 'geeked out practices' (p.36) such as gaming which do not have the same status in female friendship networks. The girls who attended *Minecraft* club came alone and did not appear to be included in any friendship groups, which may have been a major stumbling block to further participation, since Marcon's (2016) study showed that girls see gameplaying as an opportunity for social interaction.

Despite this lack of female students in the *Minecraft* Club I tried several times to involve girls in the study and had encounters with six of them in total, which took the form of four short, informal, unstructured interviews and two informal chats during *Minecraft* club time. Unfortunately, the two girls involved in the two informal encounters never came to *Minecraft* club again whilst my study was in progress. One of them was interested in programming but this became less of an emphasis for club activities which became dominated by PvP[27] and competitive building. The other was an older girl using the *Minecraft* club room to finish homework. She took pity on me when I was having trouble in *Minecraft* and tutored me. A further two were more regular attendees at the *Minecraft* club but not willing to participate further in the study beyond the initial chat although one, Lucy, was clearly interested and knowledgeable about *Minecraft*. There were also two girls using *Minecraft* in their English lessons but were not regular or habitual

[27] PvP – player versus player fighting or competition

gameplayers outside the classroom.

For the male participants of the *Minecraft* club, on the other hand, gaming was a 'pervasive social activity…a context where they casually share technical and media-related knowledge' (Ito et al., 2008, p.26). Not surprisingly then, it was much easier to recruit five male students, especially when I had established my credentials as a gamer and a fellow *Minecraft* enthusiast – as a knowledgeable peer rather than an authoritative adult. I did not wish to dismiss girls as a valid group of participants, with '…quite possibly very different play patterns, preferences, and possibilities' (Jensen & de Castell, 2010, p.57) and I acknowledge that being male might change patterns of participation and disengagement. In fact, this was borne out when a temporary, after school gaming club was set up in School E, in which the EA game *FIFA*[28] was the focus for gameplay. Attendance at this club was 100% male, with male students and staff competing against each other in a knock-out competition. The gaming practices in this club had more in common with physical football matches than digital gaming, with audiences of male students cheering the two game players as they watched the game on a large screen.

I am conscious of the dangers, particularly in ethnographic study, of the 'data gender gap' (p. xi) and the 'default male' (p.3) in the presentation of research findings (Perez, 2019). However, I should reinforce, at this point, that the individual characteristics of the human participants was not the principle focus of this study, but rather the social and material relations between humans and objects, locations and technologies in classrooms and games.

I do, nevertheless, want to provide a full description of my human participants. An additional characteristic of my male participants was that three of the five had diagnosed attention or learning difficulties, ranging from autism to dyslexia. According to O'Sullivan et al. (2017) and Heath,

[28] **FIFA** is a series of association football simulation video **games** developed and released annually by Electronic Arts under the EA Sports label.

McDaniel & Panchanathan (2019), students with learning difficulties and/or attention disorders in formal learning environments often manifest an inability to maintain attention, displaying disruptive behaviour and having poor relationships with peers and teachers. Both authors also mention that traditional classroom activities, particularly those in which information is text-heavy, can be disengaging for such students. This was something confirmed by my own findings. O'Sullivan et al. (2017) suggests freedom and variety is important for these students and that games such as *Minecraft* provide the freedom and open-endedness they require to maintain motivation and engagement. Ironically, however, many of the cited demotivating features of formal learning (lack of variety, individualised experiences, feedback on progress and performance, novelty and stimulation etc) and their suggested solutions could, in my view, be applied to any student, male or female, with or without learning or attention difficulties, in a classroom environment.

Using my 'hanging out' strategy at the weekly *Minecraft* Club lunchtime meetings, I developed a friendly relationship with the five male students based on informal chats around their *Minecraft* Club activities. The students often initiated conversation with me, both in the club and in corridors. They were keen to become co-researchers in my observations in a formal learning context - spending a day with each one in their timetabled lessons. Three of them also agreed to be filmed playing a new game called 'Terraria' and to narrate how they learnt to play it as well as taking voice recorders home to record their gameplay.

3.4.3 English 'Intervention' participants

A slightly different strategy was used in the five English Intervention classes taking part in the *Minecraft* lesson sequence. In these lessons I took the role of *Minecraft* expert, a support for the teacher and students on the technical aspects. I attended most of these classes at least once, but I followed a

particular class on a more regular basis. I asked all nine members of this class to read an information leaflet and sign a consent form (Appendix 5) since I hoped to talk to them informally and make notes on their interactions with *Minecraft*.

At the end of the six lessons I chose six students (Table 5), selected based on their willingness to participate and my observation that they were quite vocal during the lessons about the engaging aspects of using *Minecraft* as a focus for writing in their English lessons.

Student	**Gender**	**Intervention Class**
Eliza	F	7P6/Pe
Rachel	F	7P15/Pe
Josh	M	7P15/Pe
Tim	M	7P15/Pe
Charlie	M	7P2/Pe
Liam	M	7P5/Pe

Table 5 English Intervention Class participants

I also tried to pick at least one student from each of the four Intervention classes. Two girls and four boys (pp.107-8 for discussion about gender ratio) from across the five classes were withdrawn from English lessons and interviewed individually about their impressions of the *Minecraft* lessons. Since my encounters with these students were purely in school time and regarding school practices, I did not seek parental consent for my discussions with them.

3.4.4 Teacher/adult participants

The teachers and support staff (in blue, Fig 14, p.104) who were involved in

the study, apart from the *Minecraft* Club teacher, Terry and the English teacher, Ruth[29], were participants who were encountered during my 'deep hanging out' at the school or who were suggested by other participants or circumstances.

I interviewed 9 teachers and three members of the support staff, a librarian, a Special Educational Needs (SEN) keyworker[30] and the Director of Extra-curricular Activities (Table 9). I observed a total of 16 subject teachers during my following of the core student participants.

As I spent more time in the school, it became apparent to me which other people I should talk to - for example after discovering the vast range of extracurricular activities on offer I arranged to speak to the Director of Extra-Curricular Activities and had a very interesting and lengthy discussion with him. As a result of attending English lessons with students and observing a routine whereby each student came to the lesson with a book which they got out and read for 10 mins at the beginning of each lesson (without being told) I spoke to the school librarian about the history of this system (see Fig 27). This approach was similar to Geertz's (1998) 'deep hanging out', as mentioned earlier and not to be confused with the looser, more social 'hanging out' strategy I was using with students at *Minecraft* Club.

Before arranging to follow my chosen students into all their lessons for a day, I decided to interview their form tutors, not just about the individual in their form group but also about the vertical mentoring system and their impressions of the ethos and culture of the school. This seemed to be encapsulated in particular in the extracurricular activities and the relationships between staff and students and enabled me to generate a fuller picture of the academic network within which my participants were

[29] Pseudonyms used for both teachers
[30] Children with certain special educational needs are allocated a 'keyworker' who supports them within mainstream educational institutions – going to classes with them, preparing alternative materials if necessary. The keyworker referred to, Sylvie, supported Dylan, the participant with Autistic Spectrum Disorder.

experiencing learning.

In the next section I describe in more detail some of the methods I used to generate evidence of engagement and disengagement.

3.5 Methods

As has been previously discussed, there is convincing evidence that games can create a sense of engagement (Whitton and Moseley, 2014, p.440). By framing disengagement as part of the microspatial practices (Edwards et al., 2009) of both gaming and classrooms and tracing how it is enacted and emerges differently, Kraftl (2016) suggests that we can draw attention to the way in which power is negotiated and felt in school spaces (Sørensen 2009). I argue that power relations, manifested in current education policy, are responsible for entrenched and stabilised assemblages which constrain practices and relations between teachers, students and learning environment. These practices are affectively different from those in games, with different kinds of engagement emerging, which in turn affect the quality of experience for a student (Thompson and Cook 2015). By exploring how engagement is performed differently in games, we may be able to intervene to prevent the production of disengagement in formal learning.

Microspatial practices require methodological tools such as observation and the thick description of ethnography to articulate them (Kraftl 2016, p.159). The methods outlined in this section were informed by these microspatial practices and included interviews, observation, visual methods such as video recording and photographs and documentation (Fig 15).

McGregor (2003) argues that in schools

> …interactions and communications are shaped and created by networks of objects and people, students and furniture, in particular configurations… (p.355).

Mapping these interactions and communications enabled me to identify the relations which produced engagement through extensive use of visual methods such as photographs, diagrams and video recording which generated data about the relationships between space, furniture, objects, technology and people. Direct observation helped me to both immerse myself and capture the performativity of the assemblages I became a part of. Observation was highly desirable, for its ability to produce what Oliver (2012) calls 'moments of diagnosis' which can be used to make judgements about what is happening within a given assemblage. My field notes and interviews produced accounts of my own and other people's practices and the ways they enacted reality.

3.5.1 Observation

Direct observation is traditionally conducted and described firstly by the position of the researcher, as either insider, outsider or a hybrid insider-outsider occupying liminal space (Dwyer and Buckle, 2009) and secondly by the levels of participation in the field site (Robson, 2002; Savin-Baden & Howell Major, 2013). The researcher as insider would share the characteristic, role or experience being researched with the participants. The advantages of this would be that the researcher would have ease of access, entry to the research site and acceptance by participants who would be more willing to share experiences based on an assumption of common understanding. An outsider, on the other hand, someone who did not share characteristics, roles or experiences, might be able to appreciate a wider perspective and see connections, patterns and influences an insider might not. However, many within the new materialist research arena such as Schadler (2019) would assume that there is no inside or outside position since all entities

(including the human) is already inside the phenomenon or assemblage. Even though some sociomaterial researchers such as Mol (2002) still refer to insider-outsider roles, a sociomaterial approach, within which the researcher is 'following the actors' and attempting to produce an account of practices or enactments of reality, might describe this process in a less binary or more fluid way.

My own observation strategy, as described earlier, was based on the concepts of 'hanging out' and 'deep hanging out', both of which attempt to encapsulate this sense of the researcher being immersed in the research, becoming part of the enactments which result.

3.5.1.1 Classroom observation

Lesson observation was an important way to 'follow the actors'. I aimed to immerse myself in learning activities in classrooms and experience these activities alongside students and teachers. To this end, the largest proportion of classroom observation in School E was based on my core participants' experiences of learning activities in the classroom. I followed each of my core participants (Table 6) to their timetabled lessons for one day, positioning myself as an interested 'friend/supporter' of the student being observed, rather than performing a lesson observation per se. I had stressed to the students whom I accompanied that I was interested in understanding how it felt to 'be' them or at least to be another student in the lesson, in terms of the activities and opportunities for engagement. I recruited my participants as fellow observers or co-researchers and invited their opinions and commentary on the lessons they and I took part in.

I specifically asked class teachers not to announce my presence to the class in any way. Essentially, I tried to embed myself in the practices of the classroom (Taylor, 2009) and to become configured by them.

Date	Participant	Subject Lessons
7/10/17 10/10/17	Mark	Geography Maths, ICT, Science
16/10/17	Lincoln	Maths, English, Science, ICT
27/10/17	Stuart	Maths, ICT, English, Science
15/11/17	Dylan	Maths, Support for Learning, English, Music, ICT
25/10/17	Robert	ICT, English, Science, Engineering

Table 6 Day-in-the-life lesson observations of core participants

However, inevitably, in view of the numerous official lesson observations that now take place in many English schools (Section 2.1.3 p.24) other students in observed lessons did regard me as an official observer and commented on this which sometimes forced me to draw attention to myself and my role:

> Teacher talks them through one of the tests - R makes relevant observations…other students in class ask me very politely why I'm taking pictures - I explain. A student offers that he has learnt a lot from the practicals…
>
> (Excerpt from field note, 26th October 2017)

In addition, I observed whole class interaction for the English Intervention series of lessons over a six-week period and was invited to observe a lesson designated by the teacher as a 'game-based learning' lesson. Table 7 lists my 'day-in-the-life' observations by subject, the quantity of observations in each subject and the participants involved. During these lessons I took notes and photographs of participants, room layouts, classroom displays and resources and IWB slides in order to build up an account of the sociomaterial practices in each classroom and subject area (Table 7).

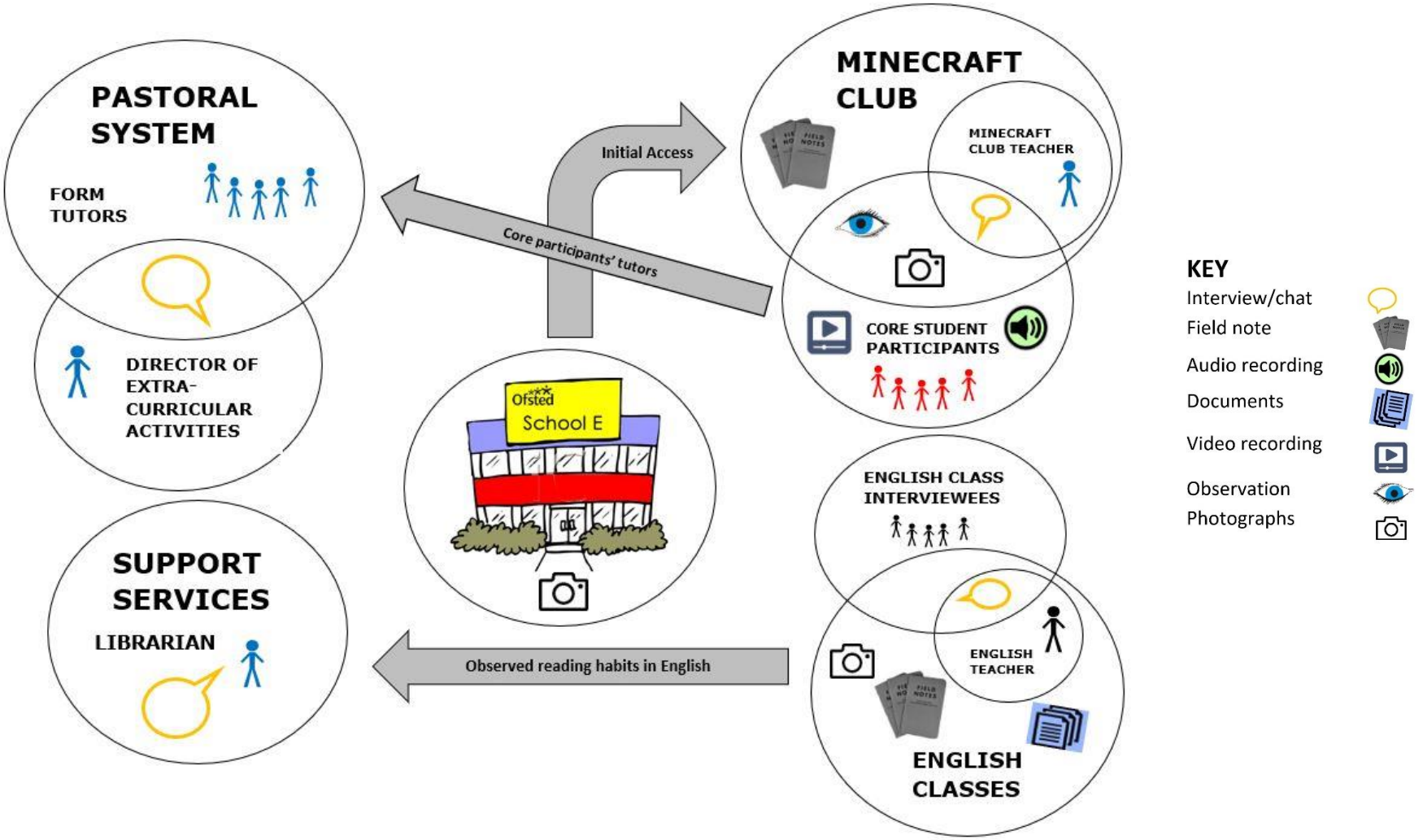


Figure 15 Methods matched to participant groups

Subject	School E Participants	No of observations
Engineering	Robert	1
Geography	Mark	1
English	Robert, Lincoln, Dylan	3
Science	Robert, Mark, Stuart, Lincoln	4
ICT/Computing	Robert, Mark, Stuart, Dylan, Lincoln	5
Music	Dylan	1
Maths	Mark, Stuart, Dylan, Lincoln	4
Support for Learning	Dylan	1
English Intervention (*Minecraft*)	Whole class (9 students)	6
Game-based learning lesson	Whole class (28 students)	1
	TOTAL	**27**

Table 7 Lesson observations by subject

3.5.2 Visual data – collection and analysis

Spatial studies often draw on visual methodologies to map interactions and spatial organisation of settings through floor maps and photographs (Fenwick, Edwards & Sawchuk, 2015). As a transcript serves as a record of an interview, videos and photographs function as records of material elements of the research setting. Decuypere and Simons (2017) call this 'visual networking analysis' which is based on Social Network Analysis. According to Van Osch & Mendelson (2011), visual media-based methodologies can capture the constitutive entanglement of social and material in practice. They argue that human activities are so complex and unfold so quickly that observation alone is not sufficient to capture this complexity and that videos allow capture of the dynamics of sociomateriality in practice. Despite this I decided to use video recording very sparingly since it did not fit in with my 'hanging out' strategy, instead preferring to audio record all conversations with participants on my mobile phone. I also decided not to use visual

networking (Decuypere and Simons 2016) to analyse my data, preferring instead to focus on particular spatial and temporal relations between technology and participants rather than the networks themselves.

When taking photographs, the researcher is making a choice about what to point the camera at and when – what to include and what to exclude and can only hope to capture a moment within an on-going event or process. I and my research apparatuses, in this case, the camera and the research objects, were all part of the same process (Schadler, 2019) so I needed to be aware of my participation with both the materiality of the photograph and the enactment within which the photo was taken.

The diagram (Fig 16) shows in which situations and with what participants I employed video recording or photographs. There were two purposes for the use of photographs in my data collection. The first was largely for documentation. Although photographs are documents, they take material form and for a moment one material object is linked to another material object and can illuminate the social relations being performed (Banks, 2001). I used still photographs to document and map the visual culture in terms of architecture, display boards, posters and room layouts.

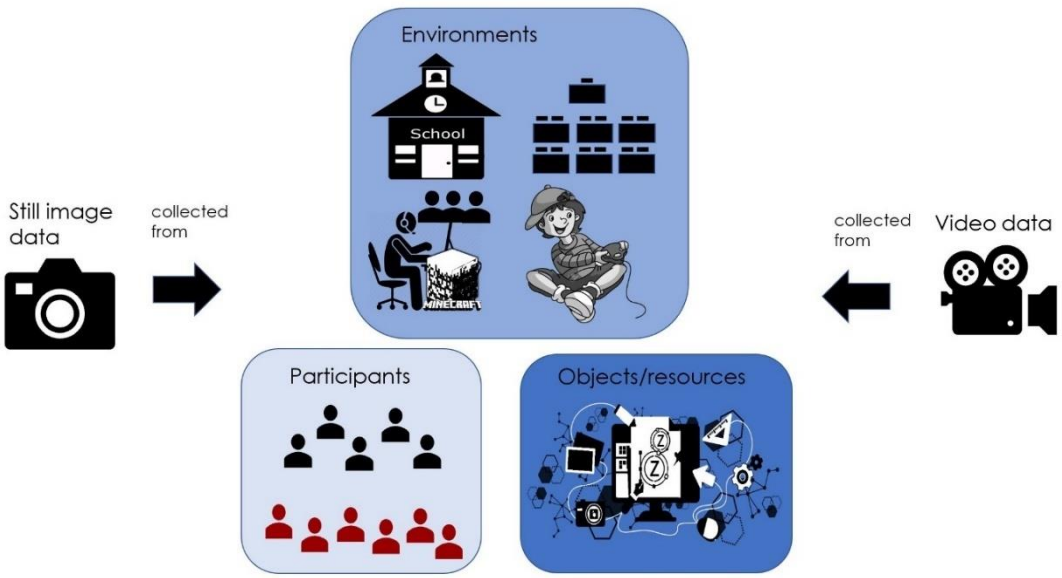


Figure 16 Visual data collection by type

I noted the locations of these visual aspects, since classroom display boards were very different to displays in public areas such as corridors and reception areas (Table 8)

Category	No of still images	Context
Participants	25	School E
Classroom layout/seating plans	18	
Classroom resources	89	
School building & environment	18	
Wall displays/signage	39	
Gaming resources/screenshots	73	Participant homes and school *Minecraft* Club
TOTAL	**262**	

Table 8 School E Categories of still images taken

As with audio recordings of interviews, I deliberately used a mobile phone rather than a conventional camera to take these pictures – there were a couple of reasons for this – the first, that it was an unobtrusive method and the second, participants were very familiar with mobile phones, particularly students, and regarded this mapping process in a relaxed manner.

The second purpose for taking photographs was related to the mapping of spatial practices referred to earlier. Pink (2013) stresses the need to understand the visual culture of a research site, the striations of the space, not only when using still images as a form of documentation, but also other visual methods used by teacher participants such as PowerPoints and technologized forms of visual representation.

School visual cultures are defined as:

> …the ready-made standardised visual scheme handed down by previous generations of teachers and authorities as an unquestioned and unquestionable guide to all observable events, rituals, situations,

objects, materials, spaces and behaviours which normally occur within everyday schooling. (Prosser, 2007 p.14)

Figure 17 School E reception area

Included in a visual scheme would be school architecture including non-teaching space, noticeboards (researcher found data) and other visual displays such as IWB (interactive whiteboard) shown in Figs 18-19:

Figure 18 School E corridor displays

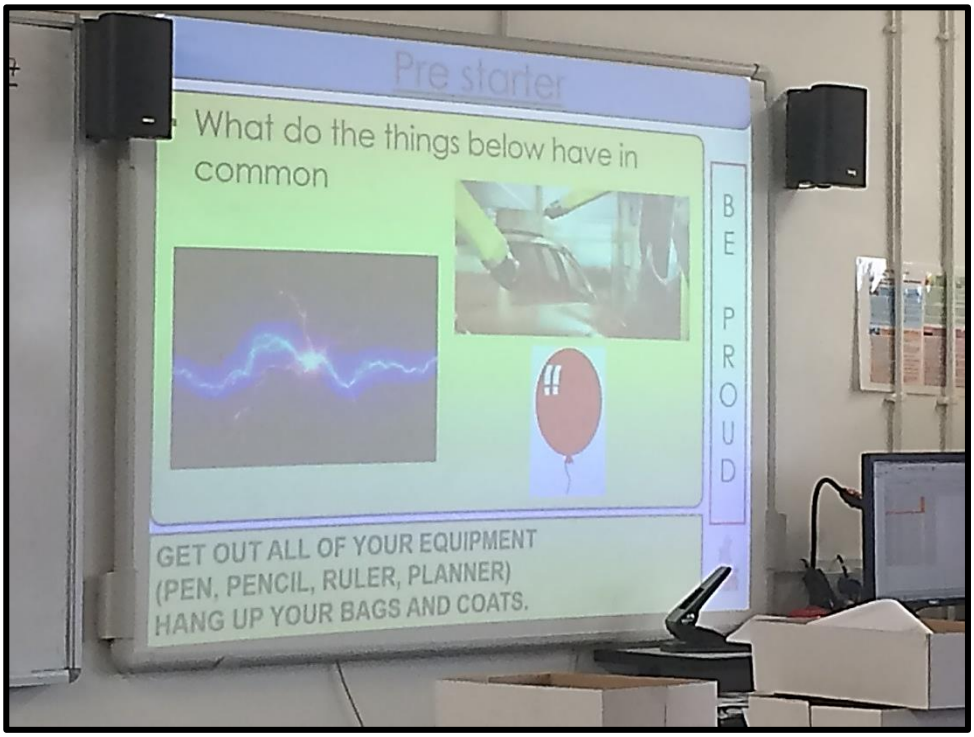


Figure 19 School E Interactive WhiteBoard in Science classroom

Teacher and pupil behaviours are mutually constitutive within a school culture which is 'manifested visually in the built environment' as well as in a pattern of behaviours (Prosser, 2007). Figure 19 shows an example of a slide used at the beginning of a lesson to establish the 'mode of existence' in the classroom, the assemblage of objects and expected activities and attitudes towards learning shown in the Attitudes to Learning poster (Fig 51).

3.5.2.1 Elicited visual and audio data

Other visual data were elicited from participants – I asked my five core participants to supply photographs of their gaming equipment at home and of themselves playing a game on this equipment (Fig 20).

Figure 20 Lincoln (core participant) home gameplay

This data were intended to enhance the audio recordings of their game play at home. I had made a conscious decision not to use video, either for student game play at home, during interviews or in my own classroom observations. There were both ethical and practical reasons for this. I had ethical approval for the use of video capture of game play only – therefore I only used video for specially arranged, private game play sessions within the school day (data not included in this study). I felt that wholescale video recording would be intrusive and contrary to ethnographic participant observation.

The audio recordings (transcripts available in Appendix 11b) of game play were elicited by asking participants to take home a hand-held voice recorder and to record a commentary of themselves attempting a new game or aspect of a familiar game. Three participants (Dylan, Robert and Mark) took part in this activity, with parental consent.

3.5.3 Other kinds of documentation

Alongside photographic documentation and mapping of assemblages I collected digital documents which reflected the ethos of each school such as their policies which were available on the school website, the teaching scheme, the timetables of *Minecraft* Club participants and some of the writing of students in the English Intervention classes, materials from lessons.

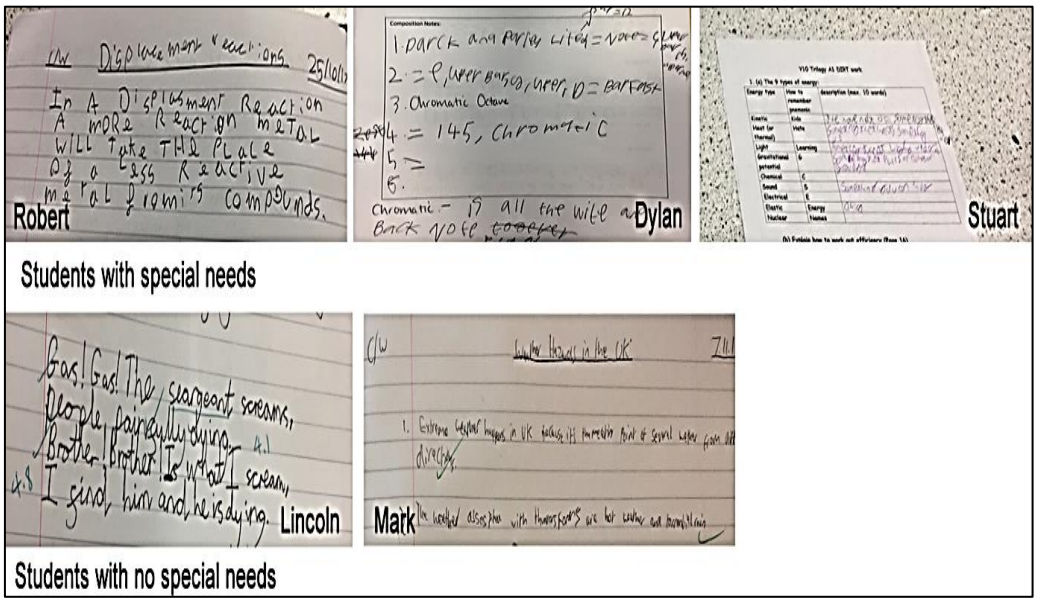


Figure 21 Examples of student handwriting

In the classroom, time is ordered and controlled by external demands such as timetables. Class periods provide the major structure and render many learning activities time-sensitive because of external demands such as timetables (Fig 22).

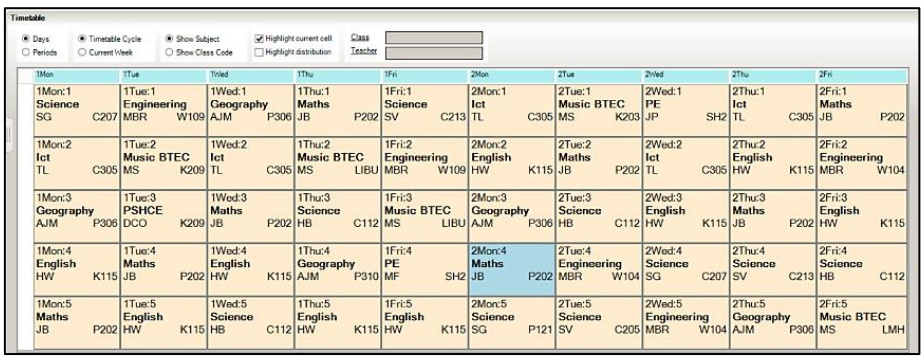


Figure 22 Example of student timetable

In digital gaming time can also be structured in various ways, internally by time-limited 'missions', countdown timers and by external demands such as household routines and so on. I collected screenshots (Fig 23) and noted timings of game play period in order to compare temporal ordering.

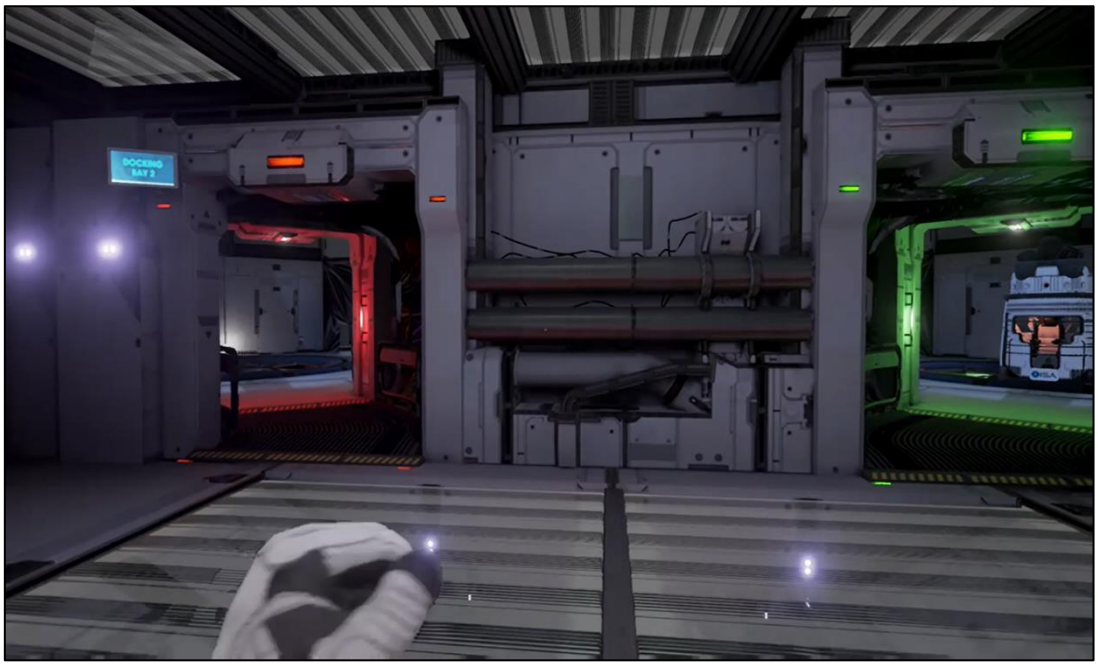


Figure 23 Screenshot of 'The Turing Test' game (Dylan)

3.5.4 Field notes

During the fieldwork phase I 'hung out' and took field notes regularly about my time in the *Minecraft* club room; whenever I took part in: game playing in *Minecraft* with students; time spent in English lessons and time spent in staff room or IT Technician's room. Field notes were made as close to these occasions as possible and stored in a OneNote Notebook (Fig 24) I have used for all my PhD thesis material.

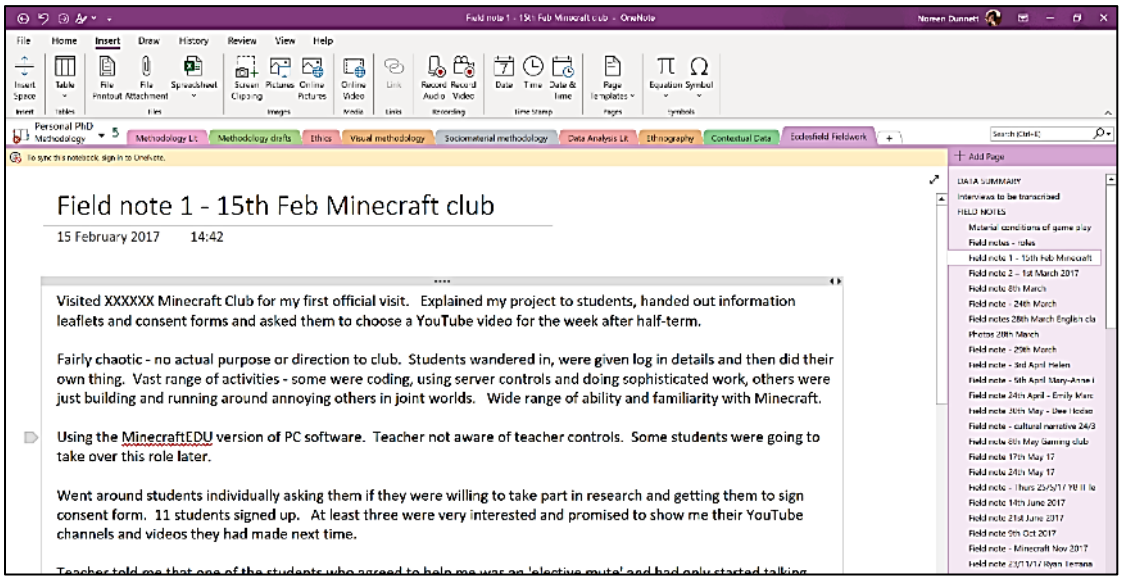


Figure 24 Sample fieldnote in OneNote

I also made field notes on my impressions of the school as-a-whole, on an after-school gaming club, a game-based lesson I was invited to – in fact any event that was noteworthy during the nine months I was working in the school.

Although I did not have video recordings of lessons as Jordan & Henderson (1995) advocate, I noted the presence and position of objects such as desks, chairs and interactive whiteboards (Fig 25) as well as technology and display boards in the classroom. Physical classroom set-ups, and artefacts such as worksheets, books and models structure interaction, sometimes providing a focus for that interaction (Jordan & Henderson, 1995). Bhatt & De Roock (2013) particularly note the effect of technology on everyday practices in the classroom:

> Our approach has revealed that a variety of agencies interfere when digital tools are used in traditional classrooms, transforming or displacing quotidian institutional practices. (p.15)

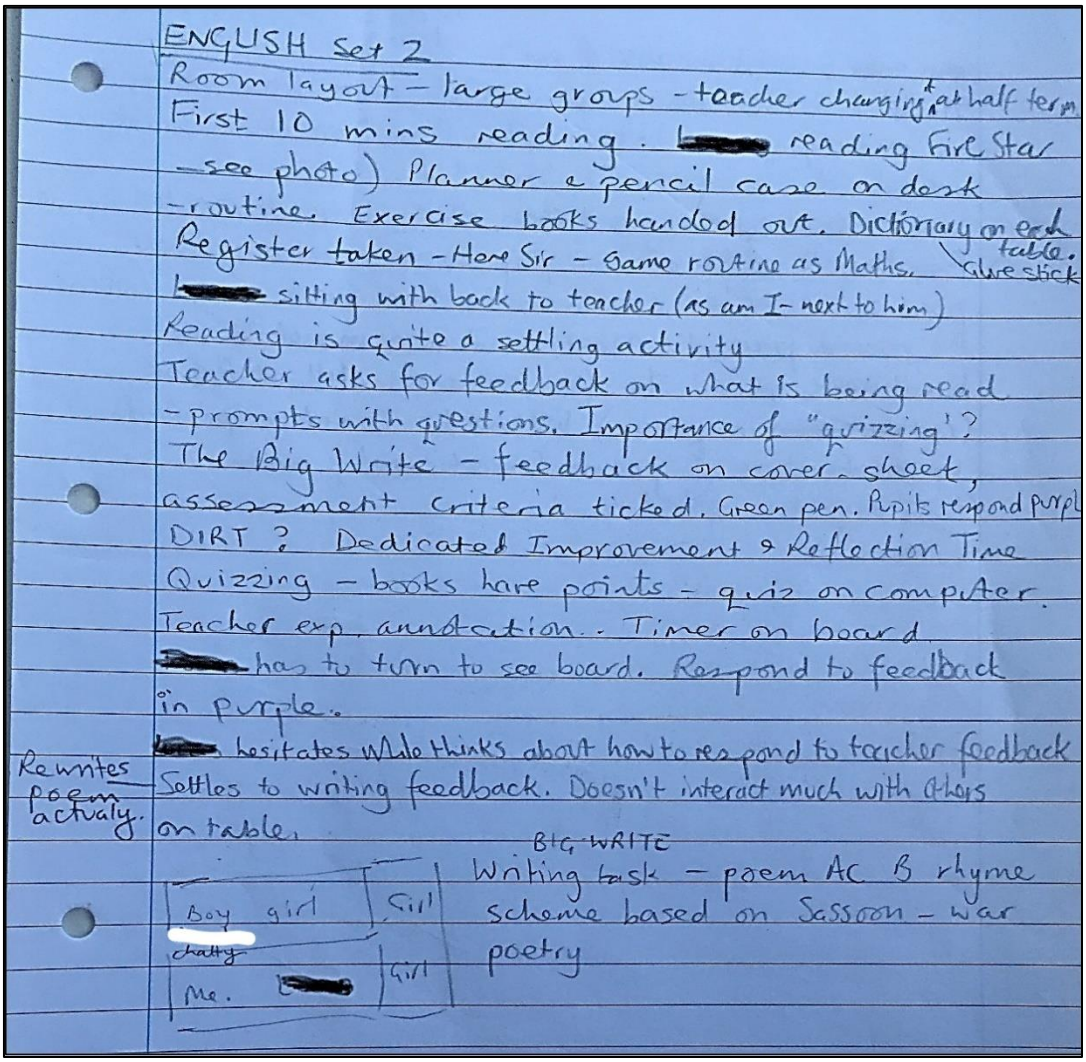


Figure 25 Example of handwritten fieldnote with seating layout (bottom L)

3.5.5 Interviews

As Hultin (2019) discusses, interviews in qualitative research have commonly been associated with representational accounts of practices, elicited from participants in a field site. Observations were then used to confirm these accounts and the researcher analysed and interpreted this information. As part of my sociomaterial approach I needed to develop techniques based on the interview as a relational practice in which myself and my participants, the objects, technology and environment were entangled together. I tried to adapt my interview technique to ensure that both social and material

actors were considered, that the human actor was not considered to the detriment of other actors. To this end, in my case study school, I adapted techniques used by other sociomaterial researchers: interviewing in the double, object elicitation, touring interviews and field interviews (Macleod et al., 2019). Each of these techniques will be discussed in the following sections.

As discussed in section 3.4. the process of selecting people to interview was opportunistic, but led by the demands of my research, or what is called snowball sampling (O'Reilly, 2008) which starts with a small sample of initial contacts. For example, before arranging to follow my chosen students (Lincoln, Stuart, Dylan, Mark and Robert) around a day of lessons I interviewed their form tutors, not just about the individual in their form group but also about the vertical mentoring system and their impressions of the ethos and culture of the school. This culture appeared to be encapsulated in the extracurricular activities and the relationships between staff and students which prompted my interview with the Director of Extra-Curricular Activities. Another example of this approach was my interview with the school librarian, Romy about the Accelerated Reader Scheme, which was prompted by my observations of a 10-minute silent reading routine in English lessons (discussed in detail on p.134-135)

Although some of these discussions with staff were semi-structured interviews - in the sense that I asked the same questions across a number of interviewees - many of the discussions with children were informal and off-the-cuff, or as Macleod et al. (2019) call them, field interviews. I had conversations with students in the corridors, in the classrooms, on the sponsored walk, in lunchtime clubs and online. These conversations were often spontaneous. Sometimes I had a particular reason for wanting to talk to a particular student. Other times the student initiated the conversation. What I aimed for in these informal encounters was to give people opportunities to share their knowledge, whether it was a student telling me about their *Minecraft* experiences or a teacher describing their pedagogy,

with a fellow enthusiast.

In total, I conducted 46 interviews of various kinds, 10 interviews with staff in my pilot schools (Tables 1 & 2) and 36 interviews with students and staff in my case study school, School E. The early teacher interviews in my pilot schools (Table 2) were conventional, semi-structured interviews. I had a flexible set of questions (Appendix 10) which I used for all interviews, revolving around the teachers' own experiences of engagement in learning, a scenario presented in video form where I asked them to comment on the engagement of a student in a class and encouraging them to discuss activities they themselves used as teachers which they felt were engaging and disengaging for students. Through these interviews I hoped to build up a narrative about disengagement in the respective schools to which the teachers belonged, to recruit these teachers as allies and co-researchers and to enable teachers to recommend engaged and disengaged students I could work with in my study.

After the initial round of interviews in my pilot schools in June/July 2016, (Table 2) I moved away from my narrative ethnographic approach to adopt a sociomaterial approach, as outlined at the beginning of this chapter. The interviews at School E, my case study school, took place over a period of 9 months, between February and November 2017 and are listed in Table 9.

STUDENT INTERVIEWS			
Participant name	**No of interviews/chats**	**Location**	**Date**
***Minecraft* club**			
Dylan – Core student participant	2	Club room and separate space	1/3/17 &15/5/17
Robert – Core student participant	2		23/3/ & 2/12/17
Lincoln – Core student participant	2		22/3 & 23/5/17
Stuart – Core student participant	2		22/3 & 17/5/17
Mark – Core student participant	2		23/3 & 17/5
Lucy – Female club member	1	Club room	14/06/17
Sonia – Female club member	1	Club room	5/4/17
English classes			
Charlie – English student	1	English office annexe	27/6/17
Liam – English student	1		
Rachel – English student	1		4/7/17
Eliza – English student	1		
Josh – English student	1		
Tim – English student	1		18/7/17
STAFF INTERVIEWS			
Teacher allies			
Terry – *Minecraft* Club	1	Private office	1/3/17
Terry – *Minecraft* Club	6 (chats)	Club room	15/2 – 12/17
Ruth – English Intervention classes	2	English office	11/3 & 2/5/17
Form tutors/support teachers (of core participants)			
Dennis – Lincoln's Form tutor	1	Form room	9/10/17
Bradley – Stuart's Form tutor	1		11/10/17
Norman – Robert's Form tutor	1		

Sylvie – Dylan's SEN Key worker	1		14/10/17
Gill – Dylan's Form Tutor	1		16/10/17
Rhian – Mark's Form tutor	1		26/10/17
Ryan – Stuart's English teacher	1	Office	27/10/17
Extracurricular/support staff			
Romy – School librarian	1	Library	20/10/17
Sam – Director of Extracurricular Activities	1	Office	14/10/17

Table 9 Participant interview list grouped by context and role

3.5.5.1 Student interviews

Interviewing students took two forms – informal chats or field interviews and semi-structured interviews. Field interviews, or quick, informal conversations are characteristic of ethnographies informed by actor-network theory. They are commonly used in situations where an activity of interest is taking place and the researcher may need clarification about the process, procedures and so on. These kinds of conversations took place in a number of locations:

- Students in *Minecraft* club room
- *Minecraft* club research participants
- *Minecraft* club teacher in club room
- Students in English Intervention classes
- Students in observation lessons

These conversations varied, from casual interchanges between myself and a student as they played *Minecraft*, to more structured sessions where I explored the participants' wider game-playing habits and attitudes to learning. Since research has demonstrated that there would be a greater chance of participatory dialogue if I positioned myself as less knowledgeable on a topic that we had in common (Harcourt et al., 2011) I framed the informal chats with students in *Minecraft* club as information

giving and sharing sessions about *Minecraft*, technology and gaming.

> Robert: On Xbox there's an actual app where you can change the edit so what you can make it is 'em you could like for example that clip and that clip together
>
> Researcher: Oh you mean like meld them together…
>
> Robert: Yeah, you can also go em - you can message people, you can text stuff on here - I think you can go on your app - let me just see - captions - so you can edit
>
> Researcher: Let me just get mine up as well so I can follow it you know what I mean so that you can show me how it works
>
> (Field interview with Robert, *Minecraft* Club, 15th Feb, 2017)

Through such an approach I hoped to observe spaces and processes hidden from me (Schadler, 2019) such as YouTube help videos and to understand what they, the objects and the technology were doing (Mulcahy, 2007) and how they were situated within assemblages.

I also had several conversations with students, whilst accompanying them to their lessons, either in the corridor or in the classroom during the lesson. These conversations concerned the content of the lesson, their feelings about it or the teacher and so on. I would also ask students for clarification about details of the lesson process or materials, as if I were a fellow student.

Often these brief interchanges overlapped with what could be called either an 'artefact' or 'touring' interview (Wherton et al., 2019) since they focused on a YouTube video or a tour through the *Minecraft* world to see structures or areas a student had built there. I would use YouTube videos or the tour to a *Minecraft* structure as a prompt to have students talk to me about what they found engaging; I would ask how they had gone about learning something new or the process they had followed to construct a virtual building or structure. Since these conversations were also conducted in the club environment, students saw them as part of the normal activity of the club.

Figure 26 Dylan's Minecraft group build from private Realm

> ND: So, talk to me about how you did that then…did you have a picture in the first place?
>
> D: Yeah I had an idea of what we would do because …there's me and other people in a team and we built this …to make people, with the brand new game…have fun... that's what my team's doing right now cos it's on a realm I've been able to put it on a realm
>
> (Field interview with Dylan, *Minecraft* Club,19th October 2017)

Interviews with English students were a little more formal since I had to arrange to extract them from subject lessons and conduct the interview in a vacant office near their classroom. I asked each student to describe a typical English class and the activities they took part in. I followed this by asking them to compare their typical English class activities with those they had taken part in during the *Minecraft* Intervention lessons, whether they enjoyed playing games and what they found engaging or disengaging in lessons. The purpose of this was to generate more evidence about actors such as technology, in the form of iPads and the part of the *Minecraft* game itself in enactments of engagement or disengagement.

3.5.5.2 Staff interviews

As mentioned in the overview to section 3.4.4, the majority of interviews with staff were semi-structured, with at least an area of questioning in mind. As teachers have very busy schedules, specific times and places usually had to be arranged for these interviews which lent them some level of formality. The school timetable imposed tight time constraints on almost all of these conversations. Staff interviews were conducted in a variety of locations, from classrooms, to form rooms and offices. The interviewing techniques for each set of interviews (summarised in Table 10) is discussed in detail, in the following pages.

Participant group	**Agenda**
Concepts of engagement	
Minecraft Club teacher - Terry	Engagement, *Minecraft* Club, game-based learning
English teacher (*Minecraft* lessons) - Ruth	Interview 1 – Engagement, game-based learning
English and engagement	
Librarian - Romy	Purpose of Accelerated Reading programme
English teacher - Ruth	Writing, *Minecraft*/game-based learning
Experience of school in non-classroom contexts	
6 x Form tutors (core student participants Lincoln, Stuart, Dylan, Robert, Mark)	Vertical mentoring, school ethos, specific participant background
Director of Extracurricular activities	Vertical mentoring, school ethos, purpose of extracurricular activities
Individual student background	
SEN Key worker - Sylvie	Background info on Dylan
Stuart's English teacher - Roy	Stuart's progress and engagement in learning.

Table 10 Participants' agenda in semi-structured interviews

3.5.5.3 Concepts of engagement – initial interviews

My initial interviews, with my principle adult participants, *Minecraft* Club teacher, Terry and English teacher Ruth, stuck fairly closely to the interview questions used with my pilot study schools (Appendix 10). At this stage in my fieldwork, my sociomaterial approach had not fully evolved but I worked closely with these two teachers and saw them as allies and co-researchers. As a result, I was keen to elicit their views and conceptions of engagement before working with their students. However, after these initial semi-structured interviews, my conversations with Terry evolved to become field interviews, during *Minecraft* Club, discussing the activities of the club members, my research and Terry's plans to develop an after-school gaming club.

Since Ruth, the organiser of the English Intervention lessons, had shown a lot of interest in using games in English lessons I had a second, longer debriefing interview after the six-week lesson series I devised. We discussed what had worked, what had not, attitudes to using technology in lessons and the reactions of students. During this meeting I presented her with an alternative model to using *Minecraft* in lessons, with the first two or three lessons planned out, which was received well and helped to further the feeling that I was a fellow teacher.

3.5.5.3 Contextual interviews - reading practices

The interview with the school librarian was opportunistic, following on from my observations of widespread use of a 10-minute silent reading starter activity in English lessons in Year 7 and 8. Interviews with a small group of students had confirmed that most of them found this activity engaging. One of my core participants, Lincoln, had showed me his book and a bookmark

(Fig 27) which all students kept in their books. The bookmark shows the student's ZPD (Zone of Proximal Development[31]) or reading level and a colour which corresponds to that level e.g. 0.1 – 0.9 Lilac, in the 'Accelerated Reader scheme'[32]. I had heard of the scheme in other schools I had worked in but I wanted to explore how and why this specific practice had become established and how it fitted in with the Accelerated Reader scheme and the school library.

I met with the librarian in the school library during a normal school day, with students coming in and out. The library was a quiet but stimulating environment, with comfortable seating (Fig 27 bottom right) and visual displays which reinforced the messages of the Accelerated Reader scheme regarding levels, book quizzes and so on. The interview itself was very much led by the librarian herself. I asked her to explain how the Accelerated Reader scheme worked and linked to the 10-minute silent reading phase in Year 7-8 English lessons. With minimal prompting, she explained in detail how the school had implemented the scheme and the effect that this was having on individual and group motivation in terms of reading and the use of the library. During this explanation I interjected mainly to ask for elucidation or expansion of certain points but also prompted her about engagement and motivation. She told me that when she arrived at School E the library was poorly stocked and very few students were borrowing books (approx. 7-10 loans a day). Since the implementation of the Accelerated Reader scheme, loans have risen to 80 books per day.

The Accelerated Reader scheme is sold to schools as an online literacy assessment tool for teachers. However, for students the scheme operates in a game-like manner. Once a student's reading level has been assessed by an online test and they have been allocated a level range (Fig 27 Lincoln's reading level range 5.0 – 12.9 shown on bookmark) students get points for

[31] Zone of Proximal Development – (presumably based on Vygotsky) is the difference between what a learner can do without help and what he or she can do with help.
[32] Accelerated Reader – online literacy software used in many English secondary schools. http://www.renlearn.co.uk/reading/

each book they read within that range with more points for longer or more challenging books. Every book in the school library has a coloured sticker on the spine, corresponding to that level. When a student finishes reading a book, they must take an online quiz. If they gain 90% score on the quiz their name is written on a leaf and added to the 'tree' in the library (shown in Figure 27 top right). The 'tree' is on a pillar near the librarian's desk, where books are returned and checked out.

Figure 27 Examples of Accelerated Reader artefacts/school library

Student names are placed in a prize draw at the end of each term as well as gaining points for their English group. The group with the highest score at the

end of each term wins a 'pizza party' for their group.

The librarian was clearly passionate about her role in creating a love of reading and a stimulating and relaxing library environment with a comprehensive range of reading material to suit all students at her school. Unlike the interviews with the teachers, Terry and Ruth, I gave the librarian an uninterrupted and open platform to narrate the story of the scheme and the library at School E. By combining her account with photographs of the library, I was able to build up a picture of how both social and material features had contributed to improved engagement with reading.

> …if they're reading ten books in their entire life and they're all from here because they enjoyed them then you know that's absolutely fine by me.
>
> (Interview with librarian, School E, Oct 2017)

3.5.5.4 Contextual interviews - form tutors - extracurricular activity

This set of interviews was quite informal, usually taking place in the 20-minute form period at the beginning of each day or after the form period at lunchtime. Prior to the interview I emailed an information sheet and consent form which I asked tutors to sign at the beginning of the interview. Interviews took place in classrooms, were usually rushed because of the time constraints. In each interview I asked the form tutor their opinion of the vertical tutoring system[33] and its contribution to the school ethos and culture, about extracurricular activities and finally to describe their tutee's (Stuart, Lincoln, Robert, Dylan or Mark) attitude to school, learning and lessons in general. The atmosphere in these interviews was relaxed and informal – I tried to build up a relationship as a fellow teacher by giving some quick

[33] Vertical tutoring - a method of organizing secondary schools in which class groups are made up of students of different ages ranging from 11 to 18 https://www.macmillandictionary.com/buzzword/entries/vertical-tutoring.html

background about my own career. Teachers were open about their views and their personal knowledge of tutees. I reciprocated by sharing information I had gained about their tutees from conversations at *Minecraft* Club – sometimes this surprised the tutor:

> NS: I think perhaps he's tried to talk to other people about it and they've not been interested...and that's put him off a little bit. But I don't know.
>
> Researcher: Yeah. I didn't realise that. [laughs] Yes, that would account for his reaction. He was very positive and very happy to talk to me about it (games)
>
> NS: Whereas I'd be able to hold my own in that conversation for all of about two seconds. So, I've tended not to bother, to be honest.
>
> (Robert's tutor (discussing his interest in digital gaming), Interview, 14th Nov 2017)

From these interviews I was able to build up a picture of my core participants, their activities outside of lessons and sometimes, family background and an idea of home circumstances and parental support for learning. As a result of the form tutor interviews, tutors suggested I speak to three further people: Dylan's key worker, Sylvie, Stuart's English teacher, Ryan and the Director of Extracurricular Activities, Sam. Dylan's tutor explained that he was on the Autistic Spectrum and that Sylvie, his key worker would be able to fill me in on any special challenges he had in engaging with formal learning in lessons. Several tutors recommended I speak to Sam, the Director of Extracurricular Activities since he had been the main architect of what was now a very successful programme. Finally, due to timetabling conflicts, I was unable to observe Stuart in his English lesson and his teacher agreed to talk to me about his progress in English instead. These extra interviews followed a similar process to the form tutor interviews, providing more background about the core participants and to the culture and ethos of the school.

3.6 Data Analysis

Research accounts to date, which take a sociomaterial approach to educational research, have tended not to give detailed descriptions of their fieldwork nor the specific methods used to undertake it (Hultin, 2019; Oliver, 2012; Johri, 2011; Mueller et al., 2012). In fact, many papers in this area do not involve empirical research but discuss the approach in theoretical or hypothetical terms, as Fenwick (2012) notes, there is:

> …a lack of robust analysis in practice-based learning of the complexities of participation… (p.2).

Roehl (2012) proposes that what is needed are analytic strategies which allow the disassembling of the classroom to 'make its material components and their activities visible' (p.113) and their role in the shaping of participants in classroom learning. Analytic strategies which have informed my own approach to analysis were Oliver's (2012) description of the design of a study of digital literacy; Bhatt & de Roock's (2013) capturing of digital literacy activities through multimodal data; Decuypere and Simons' (2016) relational approach which advocates the use of visualisations or diagrams as a technique to investigate practices in sociomaterial networks and Hopwood's (2018) idea of 'synoptic units' (p.2).

Oliver (2012) proposes that practice be the unit of analysis and that one should start by producing accounts of people's practices, which would then enable further analysis to co-ordinate different realities through 'translation, bracketing, dismissal or tolerance of ambiguity' (p.443). Practices, as defined by Cook and Brown (1999) are:

> …co-ordinated activities of individuals and groups…informed by a particular organisational or group context (p.386)

In section 3.6.1 I discuss the use of specific practices and related activities as a way of organising my data. Oliver's (2012) approach shares similarities with Hopwood's (2018) idea of 'synoptic units' or 'extractive summaries' (p.2), in the sense that they involve a narrative being produced from disparate data but unlike Oliver, Hopwood does not suggest that these summaries should begin with people or their practice but rather with certain bits of data which seem interesting. The advantage of Hopwood's approach is that it does not privilege human actors enabling the researcher to focus on interesting objects, photographs or locations as well as people. The criteria for 'co-ordinating data' also has similarities with Hopwood's suggestion that once extractive summaries have been written, the researcher can use them to identify patterns – 'commonalities, contrasts and connections' (Hopwood, 2018, p.2).

Rather than producing summaries or accounts, Decuypere and Simons' (2016) use diagrams which aim to present a distribution of words and images which show the relations between them. Their relational and topological approach is largely concerned not with identifying contrasts or conflicts but the typicalities in the practices of a particular setting such as school and the sorts of space and time which are enacted in that setting. Diagrams also help the researcher to see data as 'regions' which in themselves suggest linked and relational spaces within which actors relate with each other. Such regions, network, regional and fluid (as already discussed in section 2.2.2) were the basis of Sørensen's (2009) study of practices in schools, and were used to explore the agency and distribution of actors in different learning situations, something which also helped me with my data analysis and which I describe in detail later.

Bhatt and de Roock (2013) and Fenwick and Edwards (2010) share a notion of data as a series of empirically observable events. In Bhatt and de Roock's case, the unit of analysis was the literacy event which they describe as 'an empirical occasion involving interaction and activities around a text.' (p.4). Rather than interaction and activities around a text, when discussing

videogames, Ash (2009) talks about the *image* as an 'embodied event' (p.2107) something constructed performatively, in the moment. Mulcahy (2012), drawing on assemblage theory, refers to events as an 'affective assemblage'. Oliver (2012) also acknowledges events as units of analysis although he calls them 'moments of diagnosis' (p.445). Descriptions of data as 'events' encapsulate a performative notion (Bhatt & de Roock, 2013), in which a rich account of practical and active instances of engagement or disengagement can be scrutinised through student work, game play and learning practices.

3.6.1 Rationale for approaches to data handling and analysis

Whether data is regarded as 'regions' created through a distribution of words and images or events linked in affective assemblages, it has to be managed and manipulated by the researcher. Fenwick and Edwards (2010, p.11) describe a relatively traditional qualitative approach where researchers 'chunk, label and code' episodes, describing the issue, initiator, participants, practice and resources and examining the links/connections which answer the underlying question - in my case, how disengagement is produced. This approach tends to assume the data is similar, textual and easily comparable whereas Hopwood's (2018) synoptic units, which summarise bits of data, could span photographs, interviews and recordings to provide 'blocks of work' to play with, in which you can look for patterns and connections or links to theoretical ideas. As already mentioned, Decuypere and Simons (2016) use diagrams to scrutinise 'how practices are enacted' (p381), particularly the sorts of space and time enacted whilst Oliver (2012) advocates creating a structured description which allows the identification of conflict between different enactments of engagement and how they might be 'co-ordinated' successfully. I have used and adapted aspects of most of these approaches.

Diagrammatic visualisations are not an approach which I find personally helpful, nor did it seem a good fit with my data. Hopwood's playful approach and 'synoptic units' probably come closest to the process I followed and is described in section 3.6.3. In the next section I describe my first steps in indexing and organising data and go on to explain my decision not to use NVivo 11 after the initial stages of data analysis.

3.6.2 Indexing and organising data

As my data were collected it was stored and organised in a OneNote[34] Notebook firstly by school (including pilot schools), then by data type such as field note, interview, photograph, video and so on – these were dated (Fig 28). Observations were organised by participant and then subject area. This enabled me to find individual pieces of data easily – either by date, data type or participant name (Fig 29)

My initial instinct had been to use qualitative software to help me organise and sort my data into manageable units. To this end, I decided to use NVivo 11[35] into which I imported all of my interview transcripts, audio and video recordings, field notes, photographs and documents. My principles for grouping data were based partly on my research questions, comparing classroom and gaming practices, and partly on Decuypere and Simons' (2016) concept of typical practices in different settings. With that in mind I set up NVivo with a case or node for each school, including pilot schools with interview, documentary and photographic data stored within that case.

School E, my case study school, had a much wider range of data so

[34] Microsoft OneNote is a program for free-form information gathering and multi-user collaboration. It gathers users' notes, drawings, screen clippings, and audio commentaries. Notes can be shared with other OneNote users over the Internet or a network (Wikipedia)
[35] NVivo 11 - a qualitative data analysis computer software package produced by QSR International, for researchers working with text-based and/or multimedia information.

classroom and gaming data were organised under separate nodes, with gaming data subdivided into school and home gaming - *Minecraft* Club interviews, photographs, video and audio recordings, field notes and so on.

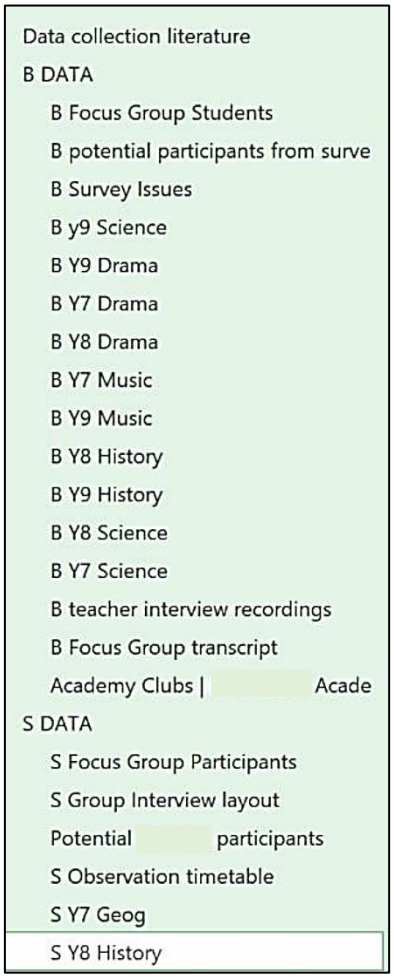


Figure 28 Pilot Schools B and S – organisation of data in OneNote

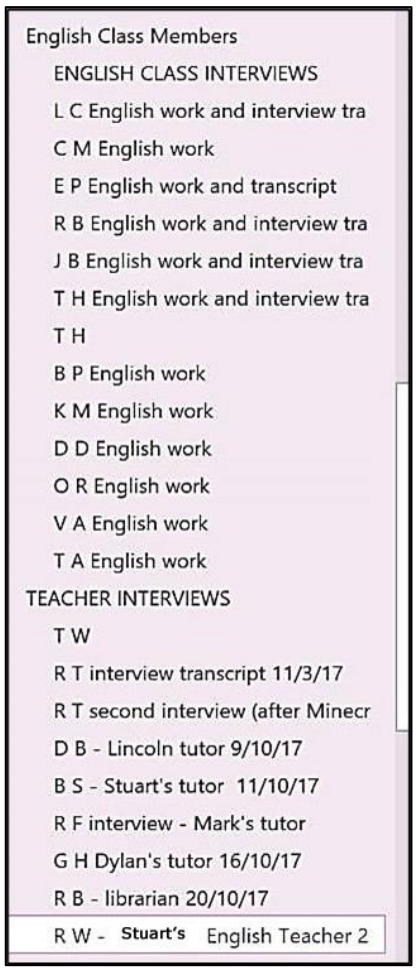


Figure 29 School E, by data type and participant

School data were arranged according to data type - lesson observations, teacher and student interviews and documentary data, photographs. This approach although not helpful for analysis, did make it easier to find certain bits of data when required for my synoptic units.

Once all data had been imported and organised, I was able to make a content listing. I re-read all transcripts, field notes and scanned through sets of photographs adding descriptions and, in this way, developed categories which I intended to use for coding. These were based on my research

questions and initial observations about practices in classrooms and digital games and were necessarily quite broad at the start:

- types of student engagement,
- pedagogical practices
- objects used in classroom
- cultural activities in school
- the organisation of space and movement

From these broad categories I developed finer sub-categories, partly from my readings of the literature on engagement in learning and gaming partly on my own instincts and observations. as shown in Table 11.

Student engagement	**Learning activities**	**Objects**	**School culture**	**Space**
Affective Cognitive Participative Attention Curiosity triggers	Demonstrations & practicals D.I.R.T[36] Info seeking Info sharing Use of technology Timings	IWB OneNote iPads Furniture	Extracurricular activities Ethos Vertical mentoring	Seating plans Grouping Personal Learning Network Movement

Table 11 Categories for data analysis

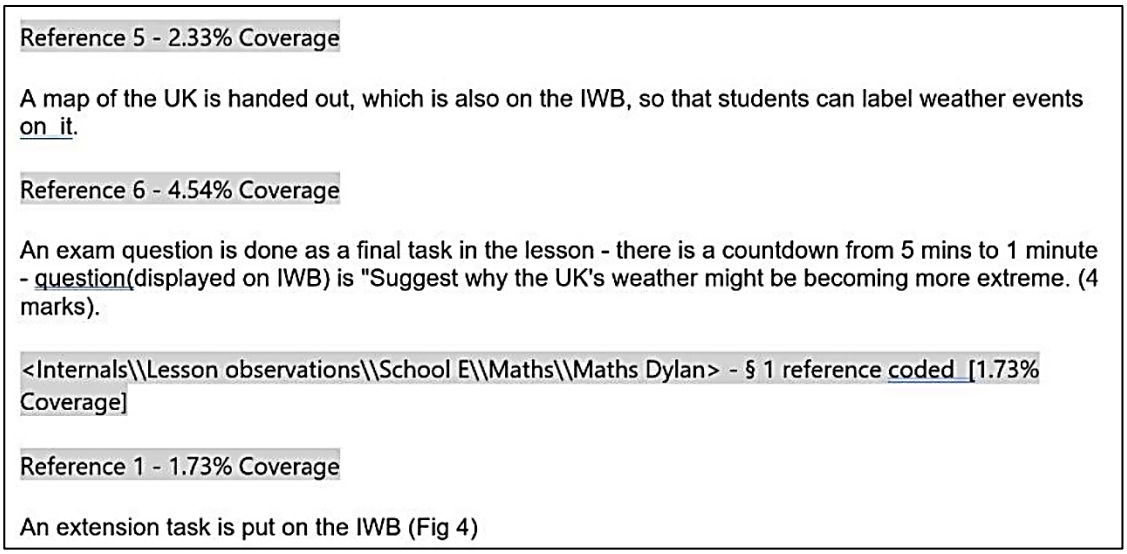
After coding all my data to the headings shown in Table 11, I found that two of my headings were unhelpful – Student engagement and School Culture. These categories, although sub-divided, did not enable me to play with data in a helpful way – there was no natural narrative emerging, at least through the use of the NVivo software. Coding did help to gather some forms of data together which moved me forward with my analysis, however.

Technology is a key actor in both gaming and classroom settings. The

[36] D.I.R.T - Dedicated Improvement and Reflection Time or Directed Improvement and Reflection Time. www.tes.com/news/directed-improvement-and-reflection-time-does-it-work

Interactive WhiteBoard (IWB) is very typically central in classroom practices. By coding all references (Fig 30) to the IWB in interviews, observations, field notes, documents and photographs I was able to discern patterns in the way that it related to other actors in the school setting. The ubiquity of the IWB in classrooms also became apparent through this coding exercise. I was able to substantiate this feeling by quantifying the instances where the IWB was mentioned or part of an activity – this confirmed that almost all formal learning situations in schools involved some use of this technology.

Other patterns of this sort also become apparent through coding, for example the way in which the words 'engage', 'engagement' and 'disengagement' occurred in interviews with teachers. Although such information was useful background, to truly explore how relations between actors were producing disengagement I needed to be able to compare and spot patterns between different pieces of data and different actors.


Reference 5 - 2.33% Coverage

A map of the UK is handed out, which is also on the IWB, so that students can label weather events on it.

Reference 6 - 4.54% Coverage

An exam question is done as a final task in the lesson - there is a countdown from 5 mins to 1 minute - question(displayed on IWB) is "Suggest why the UK's weather might be becoming more extreme. (4 marks).

<Internals\\Lesson observations\\School E\\Maths\\Maths Dylan> - § 1 reference coded [1.73% Coverage]

Reference 1 - 1.73% Coverage

An extension task is put on the IWB (Fig 4)

Figure 30 Extract from NVivo coding on IWB use

As I discussed earlier, Decuypere and Simons' (2016) topological approach uses diagrams enabling the identification of regions and the different enactment of space and time. Purely from a personal perspective, as a researcher I do not find diagrammatic approaches helpful, preferring a more narrative approach to interpreting and making links between data. Although I retained Decuypere and Simons (2016) and Sørensen (2009) notion of regions as a method of exploring the agency and distribution of actors, I adopted the more 'playful' approach to my data suggested by Hopwood (2018) and Thomson (2017). I experimented with different ways of combining it, noting patterns, connections and conflicts between different bits of data but also regarding 'events' as pieces of data in their own right. I discuss this approach in the next section.

3.6.3 Playing with data

Thomson (2017) advises ordering data in different ways – juxtaposing different information with other information and trying to make links between different data types and content. I began by reading through different types of data and identifying similarities – for example, I read through my field notes in chronological order and noted common threads in the narrative about the events I was documenting.

Several of my field notes were close to Hopwood's synoptic units – they described, in my own words, how several different forms of data appeared to be related. I then tried to use key readings from the literature to help me organise my data in broad themes related to my research questions. I juxtaposed observation notes from lessons and gaming alongside photographs (Fig 31) and from this, patterns and conflicts did start to emerge. However, instead of using strict coding categories, I started, instead, to list interesting 'events' which had occurred in lessons, *Minecraft* Club or home gaming sessions, for example:

- Robert and science experiment (p.173-5)
- Mark and the science app (p.177)
- Lincoln and computer research lesson/Robert engineering research
- Robert and terrapins (p.177)
- Robert and the computer glitch (p.246)
- Dylan and the mini games

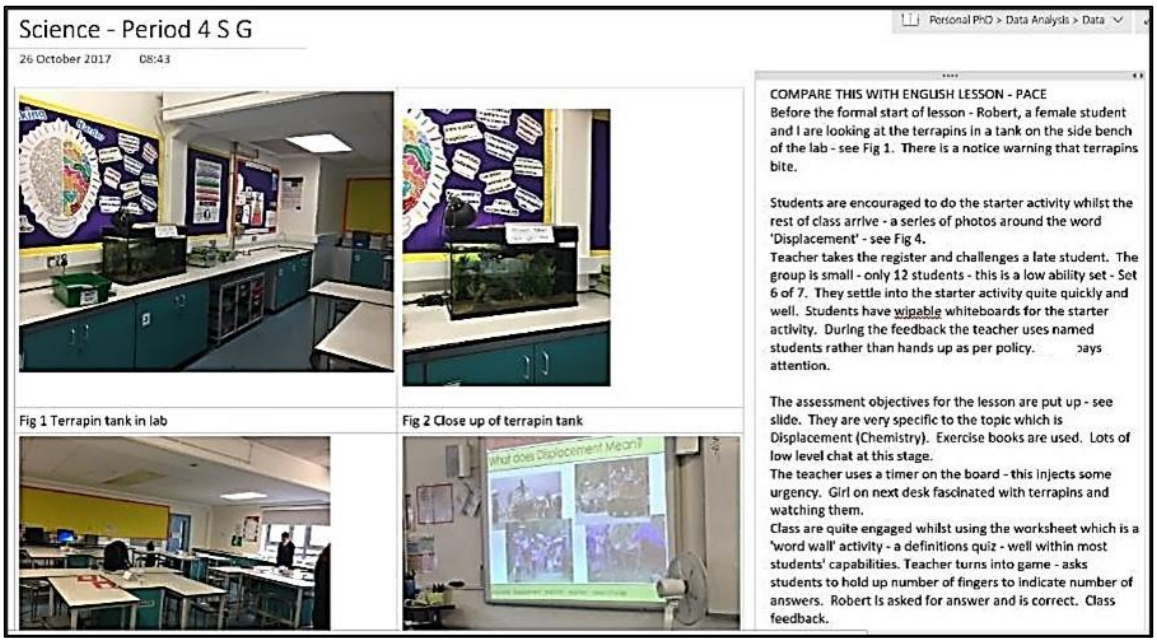


Figure 31 Robert's Science lesson - data organisation

Key events in school, particularly in lessons, tended to emerge around some form of conflict, disruption or disturbance in an 'entrenched' pattern of relations. Two such events emerged from a Science lesson which I observed whilst following one of my key participants, where conflicts or disturbances to the established pattern of relations were observed. Both events were conflicts between expected attention on the IWB and teacher and either another object or conflicting demand for attendance. The first was between the IWB/teacher and a tank with live terrapins and the second event was a conflict caused by a mobile phone reminder of a detention period, outside of timetabled lesson time and continuing attention to the IWB and attendance in a subject lesson. I played with this data by looking at the

photographs of the terrapin tank in close up (see Fig 1 in Fig 32), the label on the tank and the tank as part of the classroom context, with display boards and Science equipment surrounding it (Fig 32). I wrote up a short extractive summary to go with the pictures (Fig 33).

One object within the lesson was a large tank containing three terrapins (see Fig 1). This tank had a sign attached to the outside and a number of smaller objects, including the terrapins themselves. The tank was placed in a particular area of the classroom (see Fig 2).

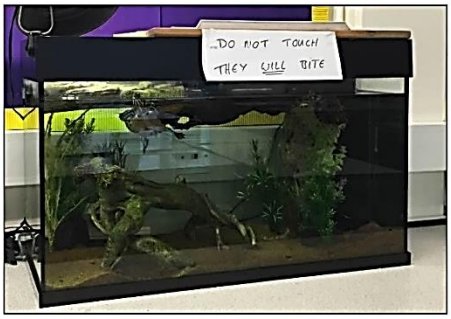


Fig 1 Terrapin tank

Fig 2 Terrapin tank on side bench

Figure 32 Synoptic unit - Robert's Science lesson

The materials for an experiment (Fig 3) were interacted with very differently to other objects in the classroom such as a terrapin tank on the side bench. If we take Linderoth (2012) approach, the interaction between the human participants in this lesson and the two sets of objects would depend on their perception of the affordances they offer. These affordances are made visible by the teacher, by the sign and by the position of the objects within the room. The sign labels the tank and the terrapins – **Do not touch, they will bite** – as not part of the activity of the lesson, at least that involving the students. The affordance of this object is for it to be observed only, rather than directly interacted with. The position of the tank, outside of the student area of the room and the eye line of the teacher and students indicates that it is not part of the activity of the lesson. Despite this, one student in the room perceived the affordances of the terrapin tank very differently to other students in the classroom and to the teacher. She focused on the affordances of the tank by observing the activities of the terrapins from the moment she entered the classroom. To her, they were the tool by which she was engaged in the lesson and in learning. Despite the fact that other objects in the room such as the experimental equipment (Fig 3) which was laid out and demonstrated by the teacher, in a central area of the classroom and explicitly made visible by the teacher (Fig 4), she continued to look and engage with the terrapin tank. It could be argued, that as Linderoth argues in the context of games, although the student recognised the affordances of the classroom, she did not become attuned to her environment. The more important question perhaps, was did she learn anything and was she engaged in that learning?

Figure 33 Extractive summary - Robert's Science lesson

The second event or 'affective assemblage' (Mulcahy, 2012) related to the alert on Robert's mobile phone which resulted in the emergence of an enactment of 'disengagement' from learning. However, as Jordan & Henderson (1995) point out, important work and demands on students go on

in the space between lessons as well as in them.

Writing this episode up as a 'synoptic unit' in my own words led me to consider the segmentation of time in the school day, and the role of artefacts such as the timetable in organising relations to produce engagement. I found an electronic copy of the student and teacher timetables for this incident and I realised that the timetable was responsible for assembling students, teachers and equipment and resources in specific locations at specific times. It soon became apparent that the organisation of time in school and gaming was crucial to the performance of engagement and disengagement in both contexts (Section 4.3 & 5.2.2).

This experience, of writing an extractive summary for a specific event, was so productive for my thinking that I began producing synoptic units around key 'objects' such as the Interactive WhiteBoard and the lesson booklet (in English Intervention lessons) as well. In the next section I discuss how I used these extractive summaries to examine the relations between humans, technology, objects and artefacts in lessons and gaming

3.6.4 Following the actors through synoptic units

The more playful approach I had adopted and the use of synoptic units to create 'blocks' for analysis enabled me to approach data in several ways. As described in the previous section I created a series of synoptic units around 'events' which had struck me particularly as performances of engagement or disengagement. I also created a series of extractive summaries around objects or technologies such as the iPad or the IWB and its role in producing engagement and disengagement. The Interactive Whiteboard was used in 85% of lessons and in all four schools in my study and as a form of visual attention, the assemblages surrounded the IWB could be contrasted with the visual attention required in digital gaming. Here I was

particularly influenced by the work of Ash (2009; 2011), who was concerned with the nature of the image as an embodied event and how it creates spaces in videogaming (Ash, 2009; 2011).

My exploration of technology intersected with my thinking about space which I considered and compared across classrooms, corridors and public spaces, lunchtime clubs as well as home and gaming spaces. The *Minecraft* game (technological software) itself was a key actant in my data, appearing in classroom spaces, lunchtime clubs and home spaces with the range of related data being drawn from interviews, video, observations, photographs and screenshots and audio commentaries. By 'following' *Minecraft* and other digital games as 'actors', I was able to explore their affordances and how capabilities and constraints shaped participants and the engagement of human subjects. For example, in the English lessons where *Minecraft* was a participant, the agency of students varied from the normal power relations between them and the teacher – they became experts if only momentarily (Section 5.2.1.1). Hardware such as the iPad also afforded the students the chance to be 'experts' and changed the dynamic of the lesson. Students themselves, in the form of my five core participants, Robert, Dylan, Stuart, Lincoln and Mark and the gaming and learning activities they were involved in also provided a way to organise and play with data as I discuss in the next section.

3.6.5 Gaming and learning activities as synoptic units

Much of the data I collected about digital gaming was directly related to my human participants, a small group of students who had been selected from the *Minecraft* Club at my case study School E. It made sense, therefore, to also group together and compare formal learning and gaming data relating to each participant, although I have tended to write explicitly about these participants in relation to individual 'events' such as a

gameplay session or a lesson, rather than focus on each human actor and compare the data collected about them.

Other synoptic units were created using Oliver's (2012) proposed unit of analysis, that of practice, or the 'co-ordinated activities of individual and groups…' (Cook and Brown, 1999, p.386). I produced accounts around certain types of gaming or learning activity or classroom practice (Table 10) which could be compared to each other such as:

- Dedicated Improvement and Reflection Time (DIRT) sessions
- Game replay sessions
- Game-based learning lessons in school compared to standard lessons
- *Rainbow Six Siege* multiplayer gameplay sessions at home
- *Minecraft* Club organisation and participation patterns

The assembling of resources and people in these synoptic units led me to re-organise photographic and observational data in terms of public spaces, classroom spaces, home spaces and gaming spaces – virtual and physical. These spaces seemed to offer particular affordances in terms of movement and interaction which enabled me to further refine my analysis.

The synoptic units listed above form part of the discussion of my findings in the following chapters. In Chapter 4 I outline my findings in secondary school classrooms, foregrounding practices from which boredom and disengagement seem to emerge, although as is demonstrated, I also observed much that was interesting about other sociomaterial practices in both secondary classrooms and digital games, particularly the role of technology as an actor.

I begin Chapter 4 with an analysis of the public and private spaces in schools, attempting to understand how they regulate and organise the affective engagement of students, before they even enter the classroom. The discussion then focuses more closely on some of the mechanisms used to regulate and order space and time in the classroom such as the seating

plan, the IWB and the timetable.

Gaming, in contrast with schools, takes place in many different spaces and contexts. My primary interest is in disengagement from school practices, my analysis of gaming spaces is organised in relation to how they overlap with and relate to school practices. In Chapter 5, I use Duncan's (2016) three framings for educational research into games to organise my discussion of findings: games *for* learning, games *as* learning and games *with* learning. In the first of these three sections I discuss the digital game *Minecraft* as a boundary object and how it might affect engagement. In the second section I compare the spatio-temporal organisation of gaming and classroom spaces, the practices which are engendered and the different performances of engagement which emerge. The final section discusses whether the 'games with learning' framing can be used to disrupt the dominant practices of the classroom in order to intervene in the production of boredom and disengagement.

Chapter 4 SCHOOL: ASSEMBLING ENGAGEMENT

4.0 Introduction

Typical understandings of spaces such as schools and classrooms tend to see them as 'contexts' or 'containers' (Baroutsis et al., 2017). However, as Mulcahy & Morrison (2017) remind us, space is both material and cultural. What we call 'school' is not confined to the physical building – it is a space enacted in the relations between actors and organised by specific types of space and time. Actors include physical locations and material objects such as offices, classrooms, wall displays, furniture, décor and plants as well as human actors such as reception staff, teachers and students, typical characteristics which identify the setting as education or school. Mulcahy (2015, p.591) defines learning spaces 'a discursive dynamic', such as the current emphasis on testing, standards and achievement, 'a material dynamic' and 'organisational set up' where actors such as trophies, symbols of academic excellence and corporate identity such as logos and branding inscribe power relations into the buildings and material practices of the school (McGregor, 2003, p.359).

In the first section of this chapter I draw on data about physical spaces, the organisational set up and how this has been influenced by the discursive dynamic of testing, standards and achievement in four schools, School E and three others as detailed in the Methodology section. I collected this data in the form of still photographs taken during site visits, school prospectuses and social media and through observation of everyday activities within spaces. In addition, I drew on my own experience as an e-learning consultant working in a wide variety of schools in a geographical region of England, where a mixture of new builds (as part of Building Schools for the Future), old and traditional 1930s buildings and 1970s style.

4.1 Public and private spaces

The way that space is organised in schools produces particular social relations, power relations in particular. Many traditional Victorian school buildings exemplified this. The high windows were designed to allow light in but not to allow students to look out of the window. Desks were arranged in rows facing the teacher and the blackboard. Many had separate entrances for boys and girls. The practices engendered by the organisation of such spaces were intended to subordinate children while also maintaining and reproducing existing power relations (Foucault, 1995).

> Many school rules and practices are connected to spatiality and embodiment, determining the use of space by students (for example excluding them from areas) and regulating their movement and expected actions in particular space-times"
>
> (McGregor, 2003 p.364)

Although such buildings are now rare, school spaces still reflect such power relations between teachers and students and influence their affective engagement. Schools are much more public spaces than they were in the Victorian era and more open to scrutiny.

Reception or foyer areas in schools connect the outside and inside world, the supervised private places for students and the public places for visitors, the community and staff members, emphasising inclusive and exclusive space. This practice of perpetuating public and private places in school communities continued during the recent COVID 19 crisis where much secondary school teaching took place online. 'Live' class sessions in Microsoft Teams or Google Classroom retain virtual 'foyer' or 'lobby' areas which prevent students entering the virtual meeting until the teacher is ready. Ironically, research on such areas discuss desirable patterns to make them '*friendly and age-appropriate*' and for them to '*foster a sense of*

community' (McGregor, 2003 p.358), engendering in students a sense of inclusion and belonging. In the following section I look at how reception areas and public spaces are assembled in some of the schools in my study and the way in which affective engagement was influenced by the organisation and regulation of these spaces.

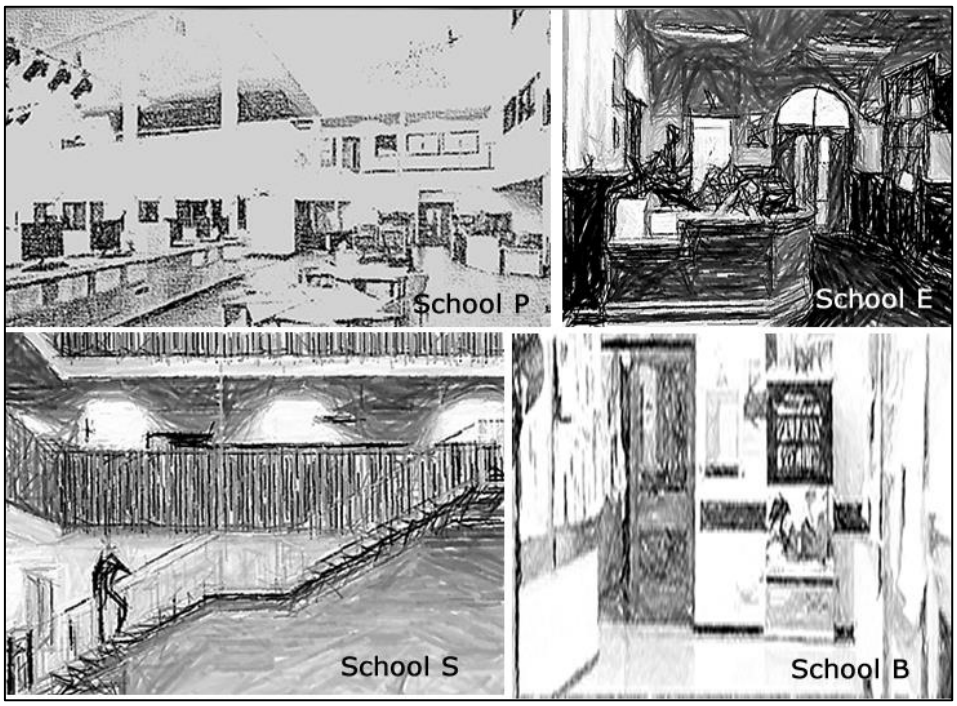


Figure 34 Reception areas in four field study schools

The reception area of my case study School E is still in the original 1930s building, a very restricted space, created for adult visitors, when the grammar school population only numbered 800 pupils and had separate entrances for boys and girls. The number of students currently is almost double this number (1684 – Aug 2020). As a consequence, the reception area (Fig 34) is only accessible to students in certain circumstances, such as when accompanied by a parent or sent on a message by a teacher. Students access the school through various entrances located behind the main building.

The separation of students from teachers when entering the school produces relations between environment, students and teachers from which a specific

sense of community emerges. Participation appears to be based on expectations of compliant behaviour from students and characterised by adult control of the physical environment. Visual and material elements in the reception area such as oak panelling, carpeting and comfortable visitor seating (Fig 34) maintain a traditional appearance associated with academic excellence which has been retained by the school despite modern buildings being in use for most learning activities. The wall inside the reception area is covered with pictures of smartly uniformed students, the head boy and girl, the student council and sports' teams. The affordances and constraints offered to an 'engaged' student are enacted here for parents and visitors: through the photos – the wearing of correct uniform; the taking on of sanctioned responsibilities such as student council and head girl); co-operation and taking part in school activities such as sport and the lack of access to this area for students. The trophy case in the second image (Fig 34 top far right) and the Staff Room door also reinforce these points.

School E's social media accounts (Fig 35) are another 'reception' area to the school, albeit a virtual one. The visual representations of school life and students are less formal and constrained than those in their physical reception area (Fig 34). Photos of pupils with Easter eggs in tutor groups and from Drama performances appear to offer alternative affordances for students to engage with school, in addition to academic excellence.

Figure 35 School E Drama dept Twitter account

In contrast, another school which was part of this study, School P, is a 'new build'. When opened in 2015, the original reception area was a huge, light-

filled atrium area (Fig 34 bottom left), with an amphitheatre for large school gatherings such as assemblies, coffee bar style seating and computers down one side, tables and chairs in groups and soft seating for visitors. This 'hybrid design [of architecture] …developed to accommodate traditional…as well as ...team teaching' (Mulcahy, Cleveland and Aberton, 2015, p577) is echoed in all the BSF schools in the geographical research area. The 'vision' for the BSF building programme is summed up in this quote from Mulcahy (2015):

> The institutions created now will physically encapsulate and determine the ideas it is possible to have about education, learning and learning relationships until the dawn of the next century.
>
> (Rudd et al., 2006, p.1)

The relations which these spaces were intended to encapsulate have largely failed to materialise, however. Neither of the two new-build schools in my study have adapted their pedagogical or social practices to take advantage of new hybrid spaces. The original intention for these open-plan spaces were to act as 'break out' areas for small groups to work informally, but such was the concern about student behaviour that this rarely happened in practice at any of the schools in my study. In the five years that the new buildings have been occupied, many of the open plan areas have been 'walled off' to provide more closed and traditional spaces such as conventional classrooms or office space, rather than engendering team teaching, as Lai, Huang and Lam (2018) reported in their study. The culture of over-surveillance and accountability promoted by the current assessment regime (Page, 2017) may also have contributed to teachers feeling intimidated by having their teaching constantly on display to fellow teachers and senior management.

Figure 36 School S open plan area with screens (July 2016)

According to teachers I interviewed, to teach in such an open area was often noisy and disruptive, both to the classes and to any-one walking through the area to reach other areas. At School S, large screens were placed around such an area (Fig 36) to provide some privacy and prevent distraction to students from other students passing through. This attitude to noise was a common theme in the literature around school buildings and innovative learning environments (Lai, Huang and Lam, 2020). Mahat et al. (2018) reported that noise impacted negatively on students' engagement and led to teachers turning open spaces back into closed classrooms. As will be discussed in detail later in this chapter, engagement and participation are recognised by compliance and attention given to the teacher, the IWB or textbook. As Mulcahy and Morrison (2017) express it, walls are' affective objects' (p.752) and open plan areas provoke 'intensities of feeling' which are not in harmony with 'standards' and a knowledge-driven curriculum.

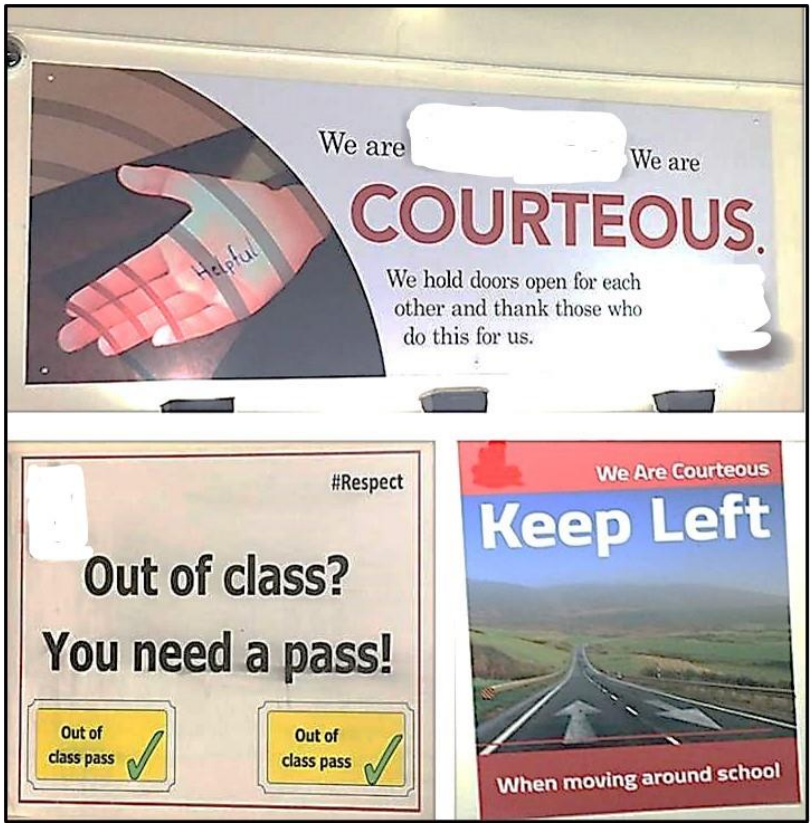


Figure 37 Signage in stairwell (School E)

Much more common, in terms of public spaces in schools, are the corridors and reception area of School E shown in Figure 38 on the next page. Corridors can contain displays, public information, and signs containing instructions to students which regulate movement from one area to another, through their affordances and constraints such as the narrow shape and the presence of doors leading to other spaces. Movement and behaviour in these spaces is constrained and regulated (Fig 37 above) by signs exhorting students to 'Keep Left', to be courteous by holding open doors and not to be in the corridor without a pass. The doors on such corridors lead to private spaces where students are either welcome or not. Doors and signs create boundaries and regions where relations are ordered in particular ways.

Figure 38 Public areas in School E

One such private space is the staff room in School E which has doors at one end leading to the reception area (where students are not allowed) and doors at the other end learning to a classroom corridor where students are allowed but which is out of sight of the general public. Similar to the access a player can gain to 'locked' areas of a game, students can gain access to the staff, if not the staff room itself, by knowing the rules or the 'key' – they can knock to gain access, for a genuine reason. Such boundaries organise the ways in which staff and students can participate socially and materially in schooling and contribute to the affective atmosphere. Boundaries can be disrupted and subverted, however, when students colonise the corridors in unofficial, non-timetabled times during lunchtime, break and after school, using them to sit, eat and socialise in, rather than purely as a means of travelling from one area to another.

The outside physical locations of the school (Fig 39) also play a role in the affective engagement of students. School E is located in a semi-rural area with green space surrounding it in the form of playing fields, lawn and trees. These spaces, the furniture or objects provide constraints or affordances which suggest the relations which can occur between actors.

Figure 39 Outside locations, School E

Human actors use the physical and visual 'clues' to participate with the environment and with each other. The area with trees, benches and tables affords sitting, eating and socialising in a non-classroom, natural environment. The quadrangle, with raised beds, a greenhouse and a scarecrow again afford informal or extracurricular activities such as gardening or socialising, whereas the walkway, with its columns and mural constrain the direction in which the human participant can move – it only affords walking in a certain direction, not sitting or eating, as with the other area pictured. However, the presence of a graffiti-style mural on the back wall of the walkway which has been painted by students, albeit under the guidance of teachers, suggest an attempt to affectively engage students in this outside area.

Many digital gaming spaces are often organised in similar ways to school buildings and outdoor areas. In Section 5.2.1.3 p. 234 I discuss Linderoth's (2012) ideas about how players become 'attuned' to the affordances and constraints of gaming environments. In the next section I look more closely at the organisation and regulation of space and movement in classrooms.

4.2 Classroom spaces

4.2.1 Regulation of space: the seating plan

Unlike corridors and outside areas, pedagogic practices regulate the use of physical space in most classrooms, organised by the teacher to encourage different forms of human participation in the learning process. In this section I draw on electronic documentation from the school VLE, photographs of seating plans and lesson observations, field notes and, as a point of comparison, an audio recording of a gaming session in a participant's (Robert's) home.

Figure 40 Mint Classroom seating plan example (sample student names)

In most English schools the object or artefact which organises space, movement and participation in the classroom is the seating plan. In School E, similarly to the curriculum timetable, seating plans were electronically generated by software called Mint Class (Fig 40)

The seating plan serves various purposes in schools including as an aid for observers of lessons such as OFSTED, easy identification of class members for

cover staff, management of behaviour, social engineering such as grouping by ability or gender, to encourage collaboration, to enable visibility of the Interactive Whiteboard (IWB)[37] etc. The seating plan is a physical manifestation of visible pedagogy and set of sociomaterial practices which are organised as regional space. Wannarka and Ruhl (2008), in common with most of the literature relating to seating arrangements in education, equate such seating plans with management of student behaviour:

> The majority of the studies sought to describe the use of seating arrangements to minimise disruptive behaviour or maximise on-task behaviour during individual activities. (p.92)

The plan controls not only how students interrelate with each other but with furniture, technology such as the IWB, computers and other objects such as Science equipment, water taps and so on. All of these elements play a part in creating opportunities for participation and engagement in learning in classrooms. Students are allocated places on the electronic seating plan which also determines the arrangement of furniture in a classroom. This arrangement is firstly determined by the curriculum subject being delivered. As can be seen in Fig 41, Geography, Music and Science all had room layouts which related to the nature of the subject and the anticipated activity. In Music, for example, there was a combination of traditional desks in rows, facing the IWB and more informal individual workstations around the edge of the classroom with electronic keyboards and computers, suggesting different kinds of participation, 'nested spaces' as Burnett (2013) calls them. In Geography desks were arranged in more conventional rows, facing the IWB.

[37] Interactive Whiteboard (IWB) - An interactive whiteboard is a large interactive display that connects to a computer and projector. Users can control the computer using their finger or a pen device on the board's surface. (University of Sydney School of Education and Social Work website)

Figure 41 Subject classroom seating layouts

Wannarka and Ruhl (2008) recognise that seating plans are directly related to traditional teacher interpretations of disengagement and off-task behaviours. Seating students in rows is acknowledged to be the best arrangement for preventing behaviours such as talking to peers, not focusing attention on the teacher and IWB at the front of the classroom and being out of seat without permission. In the Science lesson, the arrangement of high tables and stools around a central workstation (with gas taps, electric points) gave the opportunity for students to work in groups, both sitting and standing, but only when given permission by the teacher.

Figure 42 Home gaming seating layouts

In contrast, seating layouts in home gaming spaces, although superficially very similar in respect of furnishings, technology (screens, keyboards etc) are much more personalised, focused on the individual player's needs. The seating arrangements do not encourage physical interaction with other human actors, although Lincoln (Fig 42) is wearing headphones, which

indicates his relations with online fellow participants in the game. Interaction between human actors is virtual, a deliberate choice rather than an intrinsic part of the activity of gaming, as is the exact configuration of desk, chair, game controller etc. The high degree of agency afforded in these spaces enables players to physically move or cease to engage with the screen at any time.

In regional space, locations within the classroom are usually enacted as student or teacher zones - they are not flexible or optional to lesson activity, as locations might be in a videogame such as *Minecraft*. As Sørensen (2009) describes, these zones create a one-to-many relationship between students and teachers, but also between objects, teachers and students. Figure 43 shows some of the ways in which a 'teacher zone' was created in different classrooms. The first image (left to right) shows a Science classroom, with a teacher next to the IWB, clearly separated from students facing her at their desks. The second image (top right) is another Science classroom where the teacher is conducting a demonstration. Bottom left shows a Geography classroom and finally bottom right of the image, a Computing classroom.

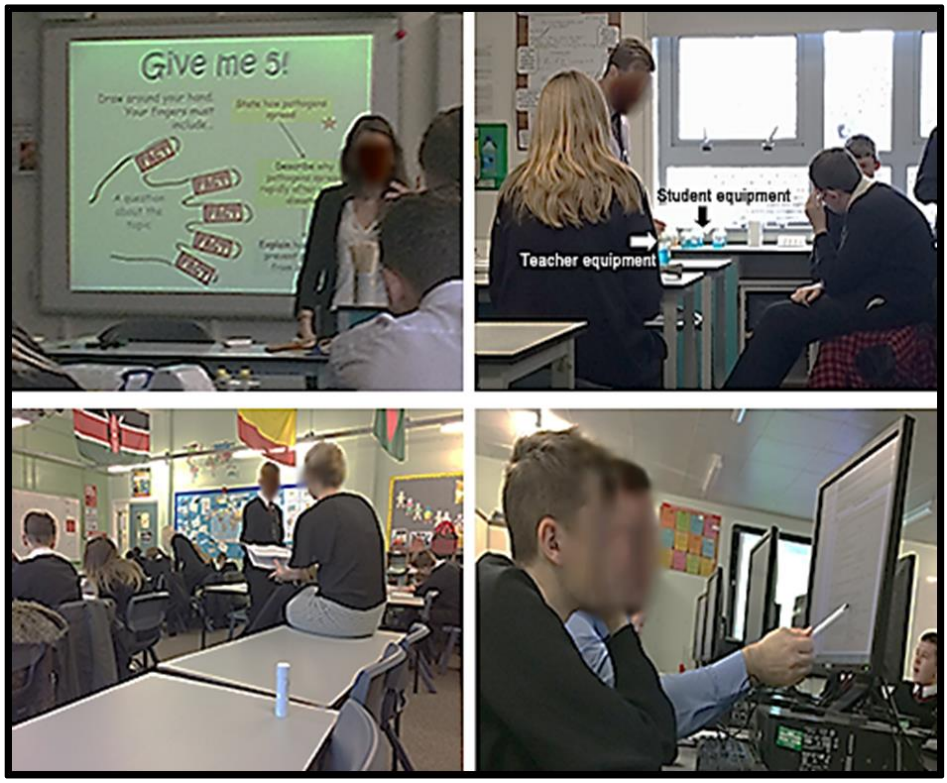


Figure 43 Teacher zones in different subject classrooms

The IWB is intrinsic to the creation of the 'teacher zone' in most classrooms. It acts as an agent to focus students' attention on the visual display associated with learning in the classroom. Students expect the 'content' of the lesson to appear on the board, or at the very least, the teacher expectations for learning that day. To perform engagement satisfactorily they are required to pay attention and comply with the performance of tasks laid out on the IWB or as instructed by the teacher. Not looking at the IWB signals disengagement.

As one teacher commented in an interview,

> I think that someone who is disengaged is **looking around, not paying attention** [my emphasis] can't answer a question that you ask them directly…can't think deeply about things.
>
> (Ruth, English teacher, 2017, Interview 1, Appendix 11 ll 201-203.

In Geography and Computing the spatial relationship between teachers and students was less conventional. The Geography teacher placed herself at the back of the classroom behind the students, in a sitting position. Being seated is generally regarded as less authoritative than standing. However, by sitting on a desk rather than in a chair, the teacher retained her ability to see the whole classroom – students, IWB, teacher computer and so on as well as re-creating the teacher zone around her new location – there was still physical space between her and the students. This relationship also distributed the agency between the IWB, the students and the teacher since attention was divided between them at key points of the lesson. Most students appeared interested and engaged, both by this spatial configuration and the pace of activities, discussed further in Section 4.3.2.1 p.189.

Conversely this was not the case with the Computing teacher Terry, who sat alongside the student Mark, on a chair and in front of the student's individual

screen. This was one of very few occasions where I saw an apparently one-to-one relationship between student and teacher where teacher authority was maintained by the invasion of the student zone. Rather than engaging him, Mark was clearly uncomfortable (he confirmed this in a comment to me later) about being forced to pay attention, to engage in the lesson content by the close physical proximity of the teacher. I noted the student's hand (Fig 43 bottom right) being used to maintain a barrier between himself and the teacher. The teacher's arm is reaching across to point at something on the student's computer screen. Students appeared to become disengaged when they lost agency over their personal space, time or actions. For example, detentions were used to exercise teacher agency within non-curricular times such as breaks and lunchtimes.

In Computing classrooms, it is computer monitors which create an individual zone around each student, who sit alongside other students, perpendicular to the teacher and IWB. To perform engagement, students focused attention on their own screen rather than the IWB since lesson content was duplicated on both IWB and individual screens. The students had no need to change their focus or engage with other students, in fact to do so would have risked being identified as disengaged from the lesson task. There is a striking similarity between this use of space and the physical gaming spaces of students both at home and in *Minecraft* Club at school (see Fig 68). However, there is no choice to engage with other students virtually or to step away from their screen and activity.

Although the IWB is a key actor in creating 'teacher zones' in the classroom, (Sørensen, 2009) other objects also participate in their creation. In the Science demo I observed, the teacher stood at an empty group of benches, with students standing or sitting around him, two spatially distinct zones, with attention focused on the teacher.

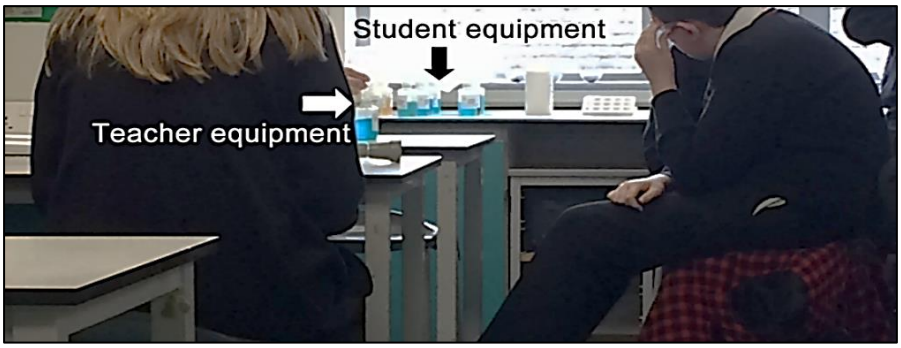


Figure 44 Experimental equipment for students and teacher

The experimental equipment had its own space, the teacher's equipment set up within the clearly designated teacher zone and the students' equipment, physically separate from the main activity of the classroom (writing) on a side bench (Fig 44),

By contrast, on two separate occasions in my wider sample of schools, students were invited into the 'teacher zone' around the IWB (Fig 45) This generated a greater sense of active participation on the part of the students. Rather than sitting, they stood around the teacher, creating a sense of movement and activity rather than passivity.

Figure 45 Teacher zone in Science lesson, School P (Dec 2016)

Restrictions to movement appeared important in engaging or disengaging

participants in my study. The seating plan, as described earlier, was designed to prevent disengagement in the form of off-task behaviour such as 'being out of seat without permission' (Wannarka & Ruhl 2008, p.91). This production of material and social space demonstrated power relations in terms of who is allowed to move around the room. Being afforded the ability for independent movement within a physical location generates much affective engagement as I confirmed in my observation of a game-based learning lesson on Cryptography in the Computing department (discussed in Section 5.3.2).

In this section I have focused on location, physical environment and movement and its role in engagement. In the next section I focus more closely on the agency and participation of one specific technological actor, the Interactive White Board, and how it creates attention, engagement and power relations in the classroom.

4.2.2 Technology and space: The Interactive WhiteBoard (IWB)

Interactive whiteboards have been in classroom use since the 1990s and are a ubiquitous tool in most English secondary schools in 2020. They are generally between forty-two inches to seventy-two inches diagonally, wall-mounted or placed on a separate stand. The touch-sensitive board allows teachers/students to interact directly with applications without having to be physically at the computer which is projecting the image onto the board. Elements of text, graphics, sound, animation, and video can be incorporated into presentations displayed on it. Information can also be typed using a computer keyboard or handwritten directly on the board using a wide range of colours and saved for future use.

In my focus school, School E, 16/19 of observed lessons made use of the IWB. The touch-sensitive screen was intended to provide 'interactivity', affording both students and teachers the ability to write, draw and activate various

kinds of content. In practice students rarely touched the IWB or interacted physically with it in any way.

IWBs fit the existing pedagogic practices which predominate in many secondary schools, those of whole class teaching, direct instruction and transmission of content (Jewitt, Moss & Cardini, 2007). In the majority of lessons, across the four schools in which I observed, the IWB was used essentially a teacher presentation tool, with the IWB replacing the traditional blackboard and the teacher remaining at the front of the classroom and writing dominating the presentation on the board.

Interestingly, during the COVID 19 period of online learning, teachers continued to rely on this form of presentation, attempting to replicate the experience either replacing the IWB with various online whiteboards substitutes such as *Explain Everything*[38] and *Microsoft Teams Whiteboard*, or by recording an online lesson which incorporated the same features and focus of student attention on the teacher 'talking head' and a PowerPoint presentation as shown in Figure 46 (Oak National Academy, 2020; BBC Bitesize, 2020). Although these IWB substitutes were online, participation was similar to within a physical classroom in the sense that it anchored students' attention and agency with regard to movement. Students were intended, through the affordances of the online activities, to sit looking at their screen and follow a series of linear, sequential tasks within a specified time period. Admittedly, there was scope for students to stop and replay content or to get up and walk away in the home context, however.

In my sample schools the IWB was used in more or less engaging ways depending on the teacher who was using it. For example, the multi-media functionality of the IWB was used to good effect in terms of engagement in Music lessons in School B. The teacher used sounds as listening exercises; music extracts from Britten's 'Young Person's Guide to the Orchestra', to

[38] Explain Everything – a whiteboard app for tablets, mobile phones and laptops https://www.youtube.com/watch?v=b00ZeszvjP4

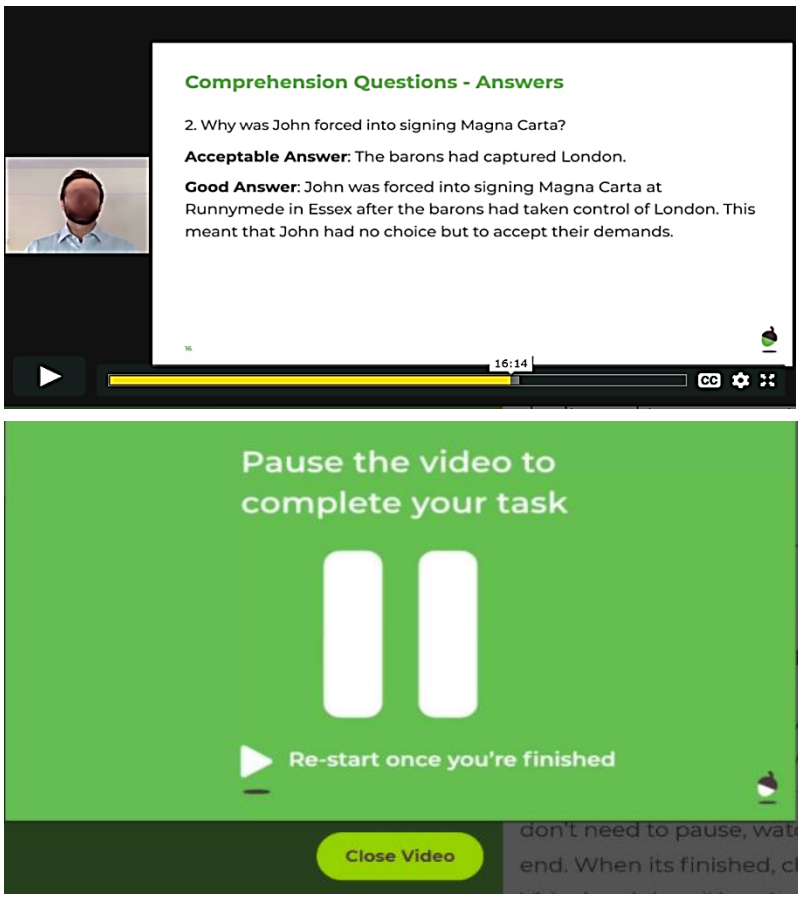


Figure 46 Oak National Academy online Year 7 History materials

illustrate key points and to encourage discussion and she demonstrated musical points on the keyboard as well as asking students to play extracts of their own compositions. The flow of the lesson was maintained by the ease of movement from one application to another but the teacher in this example also created opportunities for exploration and active student participation by inviting them to contribute their own compositions.

In contrast to these examples, a teacher interview at School S suggested that in their academy chain, there may be an over-reliance on using the IWB to display endless text-based PowerPoint slides. IWBs fit the spatial logic of the classroom and lend themselves to transfer and transmission models of learning and whole-class teaching, Unfortunately, as the teacher commented:

> "Well just pretty much every lesson …it could be like a slideshow that's basically forty odd slides long… it's very, very teacher reliant… they're bored out their minds"
>
> (Jackie, Geography teacher, School S, 2016 ll 74-78, Appendix 11)

It is not surprising therefore, that IWBs have been associated concurrently with student passivity as well as with greater student engagement, as described in the Music lesson.

Interestingly, many teachers do not use even the most basic functionality of the IWB – to write and draw – preferring a non-interactive whiteboard located close to the IWB at the front of the classroom (which was the case in all classrooms in School E). This may have been for practical and financial reasons – the whiteboard was used to perform ephemeral actions such as calculations, spellings and explanations which were erased at points throughout the lesson. I observed this in several Maths lessons in School E.

Gourlay (2017) discusses the notion of agency being extended to artefacts conventionally regarded as 'tools' in learning situations, such as interactive whiteboards (IWB). Agency largely takes the form of attention, in the form of gaze, with the IWB becoming 'a regional technology' (Sørensen, 2009), the place to which attention is focused (Beauchamp and Parkinson, 2005). Interestingly the placing of whiteboards next to Interactive Whiteboards draws attention to the materiality of one in relation to the other. The physical act of writing on the whiteboard during a lesson gives it a 'visual materiality' (Sørensen, 2009) which the pre-prepared PowerPoint slides on the IWB lack. Although in theory the text and images on these slides could be altered or manipulated during the lesson itself, this would have to be done from the teacher's computer, from which the presentation was being projected. Again, it is possible for students to do this – with a wireless mouse and keyboard, students can type or draw on the IWB. The ability to manipulate and re-configure images is much more apparent in digital games, as will be discussed in Chapter 5.

In an observed Science lesson in School E, the IWB often constrained the form of engagement the students were able to perform. They could perform compliance by paying attention to the screen – they were encouraged to do this by the physical layout of the room which emphasised the separation between teacher and student regions. Schoenau-Fog (2011) who defined engagement in a videogame as 'the level of continuation desire' (p.4) noted that 'interfacing' (p.8), the physical actions that players carry out in order to reach their objectives - can affect continuation desire. It may be that the lack of ability to take physical actions regarding the visual content on the IWB may be also be a cause of disengagement, particularly if the content is in the form of text. Kamstrupp (2016) explicitly notes that boredom is seen as a lack of 'doing', created by a 'field of tension between being active and sedentary' (p.89), where the possibilities for action were limited.

Students generally have no ability to re-arrange or explore material on the IWB in their own way. The only form of engagement that is available to them is participative engagement (Bernstein 2004), where there is an imposed goal by the teacher. In contrast Ash (2009, p.2116) comments that first person shooter games enable players to manipulate directly what can be seen and how it is seen. Ironically, the online History lesson referred to earlier (Fig 46) did allow students limited ability to explore the material in their own way – they could stop and start the video in which the teacher was presenting the material or skip it entirely (Fig 46) – I comment further on this affordance in section 4.2.3. Future research around online learning in schools during COVID 19 might follow up whether engagement was produced by this affordance.

4.2.3 Objects and agency in classroom spaces

The ability to manipulate and handle objects in lessons appears to have a direct effect on the participation and affective engagement of students in

lessons, as The Royal Society of Chemistry (in Dillon, 2008) point out:

> …studies have shown that practical and investigative work has a marked positive effect on pupils' enjoyment and learning of science (ibid., p. 48).

This is noteworthy in Science where equipment (objects) are potentially dangerous and hence there are particular constraints but also potential affordances, with many characteristics of invisible pedagogy (Bernstein, 2004) such as implicit rather than explicit teacher control, greater student powers to re-arrange and explore the experimental situation and more multiple criteria for evaluation. In practice, this was not the case, in my lesson observation at least. Teacher control was explicit - students were not allowed to touch the equipment until after the teacher demonstration (Fig 48). They had no power to re-arrange and explore the experimental situation nor took part in the design of their own experiment – this was laid out explicitly in a slide on the IWB (Fig 47)

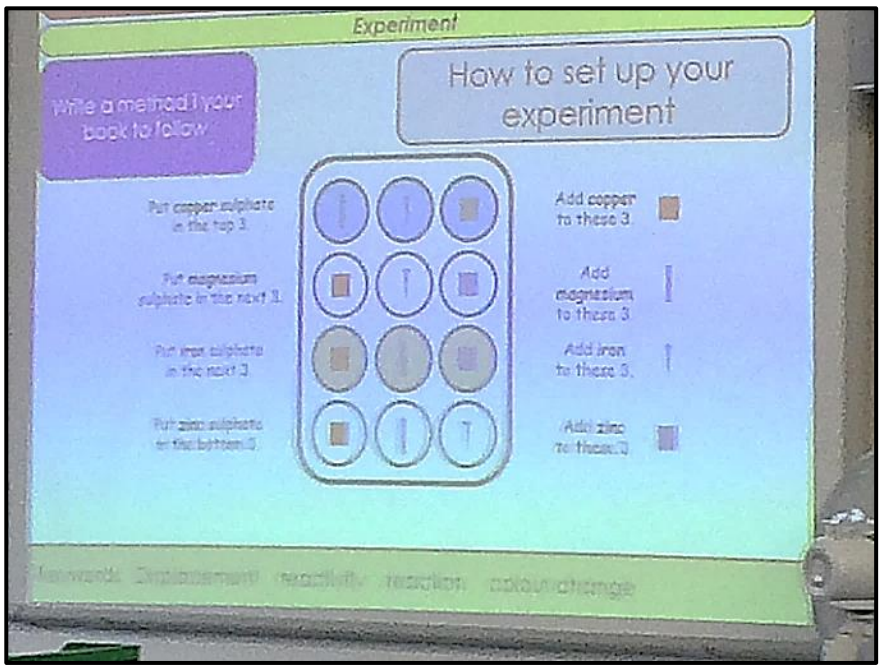


Figure 47 PowerPoint slide with instructions for Science experiment

OFSTED 2005 (in Dillon, 2008) commented on the disengaging nature of practical work,

> …where pupils only carry out instructions from worksheets to complete a practical activity" noting that students were 'limited in the ways they can contribute. (p.38)

This was not representative of all the Science lessons I observed during my research – in School B (a school recognised for its outstanding Science department) a teacher described a Year 7 lesson in which he felt students had been highly engaged. As was advocated in Dillon (2008) students were encouraged to design their own experiment to prove that acid rain damages plants and animals. The teacher, Tom described the process (Interview, Appendix 11, ll.90-26) which began with trial and error, which he felt was a good place to start. Trial and error is a common approach to learning in games. In some subjects, such as programming in Computing, this approach was also encouraged in School E and will be discussed later.

The acid rain lesson was engaging because it took place in an outside location, a more fluid space which afforded immediate access to materials, such as a range of scientific equipment and natural material in the physical setting. The students were affectively and cognitively engaged by the opportunity to participate with objects such as rocks, plants and insects, resolving the tension between being active and sedentary, as described by Kamstrupp (2016). The agency afforded in this situation enabled them to arrive at the idea of experimental variables such as size, location, and type of material, independently of teacher input. Students, objects, technology and the teacher all helped to enact the acid rain experiment. There were multiple ways to perform engagement and by implication, fewer ways to perform disengagement or to become bored.

In contrast, School E's observed Science lesson was a regional space, with separate teacher and student zones and a one-to-many relationship between teacher and students. During the practical activity in this lesson, there was clear evidence of affective engagement from students, although more constrained in its performance. Constraints to movement and action

on the part of students included lack of access to the experimental equipment until after the teacher demonstration (Fig 48) and explicit instructions about the procedure to be followed. However, the greater scaffolding, such as the teacher demonstration; access to in-context information in the form of experimental instructions displayed on the IWB (Fig 47) and direct instruction could also be seen as affordances which students could take advantage of, just as gaming walkthroughs give players the ability to watch an activity before attempting it themselves.

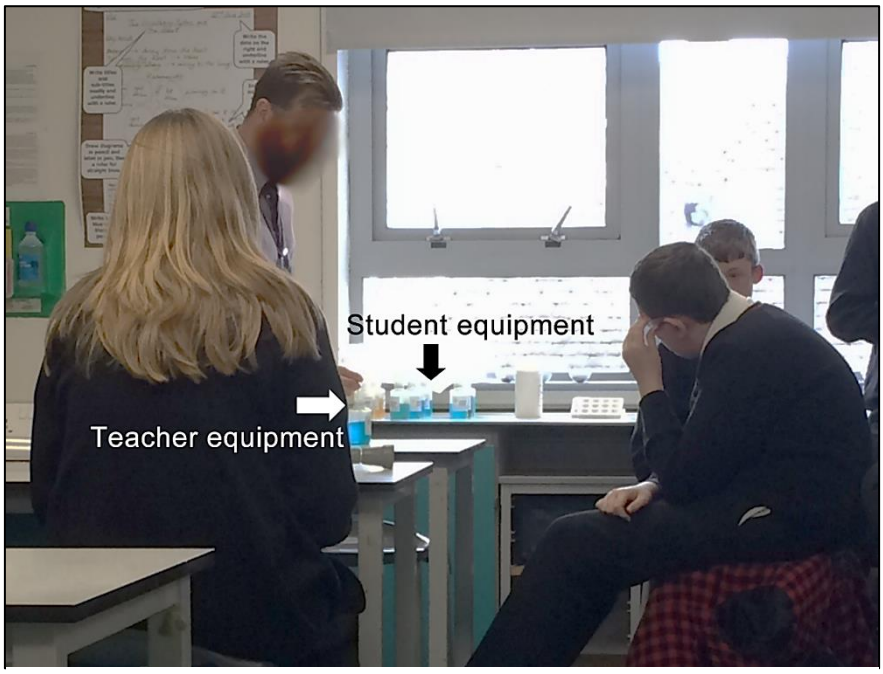


Figure 48 Science demonstration illustrating teacher/student relations

There are, however, important differences in the relations between instructions, players and gaming environments – replays or gameplay demos afford more agency to the player – they can be slowed down, paused and re-viewed at will. Unlike the instructions slide in the Science lesson, game players can tailor just-in-time information to their individual needs, for example, using audio or video instructions rather than written instructions. These affordances were offered by the online lessons provided by Oak Academy, however (Fig 46). More discussion of the role of game replays is provided in Section 4.4.3.

Another student, Mark, who was also observed in a Science lesson in School E, confided that although he had loved Science at the beginning of secondary school he found the constraints and passive nature of his Science lessons very boring and disengaging, so much so that he had bought himself an expensive chemistry app which enabled independent virtual experimentation and electively with others, in his case, his mother.

Although a psychological construct, Arnone et al. (2011) associate the arousal of curiosity and the ability to satisfy that curiosity as necessary for engagement in learning activities, pointing out that digital games rely on uncertainty as a vital 'curiosity trigger'. What is of interest here for a sociomaterial approach to boredom is that Arnone et al. (2011) suggest that the means to resolve this curiosity can come via a range of media skills. Technology and objects can play a part in allowing students to pursue their curiosity, through online information, videos and expert forums. In the classroom, access to information is usually controlled by the teacher and distributed as representational knowledge through the IWB, textbooks, teacher talk. Little use is made of other methods such as 'googling' which are common-place in out-of-school contexts.

I directly compared two incidents from my own fieldwork where my participant Robert, had his curiosity triggered, firstly in an observed Science lesson and secondly in a recorded *Rainbow Six Siege* gameplay session. Comparing a 'lagging glitch' encountered in *Rainbow Six Siege* (also described in detail in section 5.2.2.1) to an incident in the Science lesson, very different affordances and constraints were available.

Before the official start of the Science lesson, Robert and a fellow student, who had arrived early, were drawn to a tank containing three terrapins (Fig 49) which was on a side bench in the lab. The sign which labelled the tank and the terrapins – **Do not touch, they <u>will</u> bite** – was not part of the activity of the lesson but providing a hook for their curiosity. Both students became affectively rather than participatively engaged, in exploratory mode as they

might be in a game, interested in the terrapins and their behaviour. However, unlike the gaming glitch incident, access to further resources, such as YouTube or Google, which might have satisfied their desire for more information, resolved curiosity and resulted in engagement, were not to hand.

The use of mobile phones, to perform a Google search for example, is prohibited in classrooms and there were no student computers available either. Arnone et al. (2011) see information seeking as 'the resolution of curiosity' which in itself has been identified as engagement, but

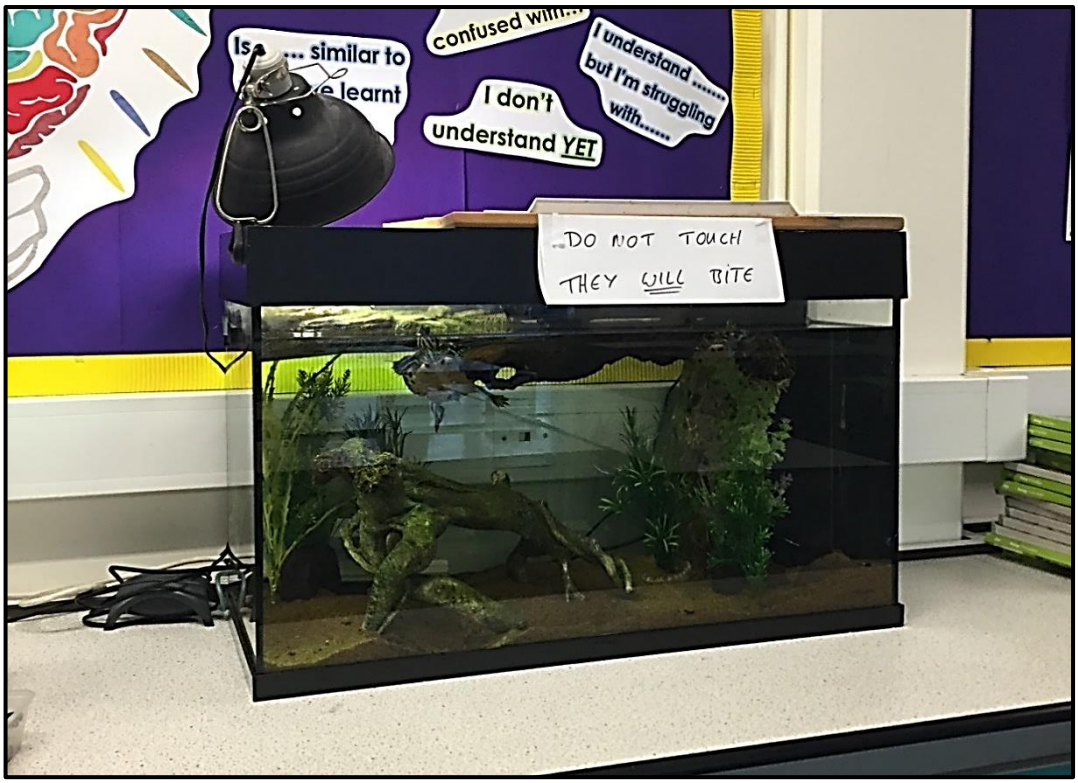


Figure 49 Terrapin tank in Robert's Science lesson

> …if information seeking cannot be satisfied in a timely manner, with minimal effort, interest is compromised, and engagement may not occur, or may not occur to the depth that is desirable and possible.
>
> (Arnone, 2011, p191)

Interest in the terrapin tank was re-ignited later in the lesson - Robert and his fellow student continued to focus their gaze on it rather than the official lesson activities. The terrapin tank was part of the classroom assemblage and gained greater agency in this situation. However, it was treated as a hostile external force, incapable of being assimilated into the network and hence in competition with the regional space created around the IWB and teacher at the front of the classroom. Students' attention was re-directed, away from the tank and back to the IWB. Their lack of attention to the teacher and IWB was interpreted as boredom and evidence of their disengagement from official activity, rather than as interest in learning about the terrapins.

In contrast, Robert's interest in pursuing information about the 'lagging' glitch he encountered whilst participating in the more fluid space of the online *Rainbow Six Siege* gameplay session was satisfied without the gameplay process breaking down. The gaming assemblage enabled more enactments of engagement to emerge.

Although space and time are inextricably intertwined in spatial approaches, temporal considerations are particularly striking in a comparison of classroom and gaming practices in relation to the production of boredom. As discussed in the literature review, boredom is closely associated with perceptions of the passing of time (Belton and Priyadharshini, 2007; Breidenstein, 2007; Macklem, 2015). In the next section I look more closely at the organisation of time in schools, the practices which emerge and the impact on students' affective engagement.

4.3 Time

4.3.1 The role of the timetable

As Fenwick (2011) makes clear, for forms of education which have to do with media, technology, distance and the online, 'the ordering of space-time has become a critical influence' (p.11). The spatio-temporal arrangement of the classroom environment is organised to perform relatively stable and patterned ways of enacting engagement, often in the form of compliance with expectations regarding time constraints and associated spatial arrangements. Disengagement, therefore, could be characterised as different forms of presence which emerge in opposition to powerful and entrenched patterns of engagement in a specific assemblage.

In official school spaces, for example, time is used on a particular task until it is completed, whereas in unofficial settings such as *Minecraft* Club online spaces young people multi-task, doing different tasks at the same time (Kupiainen, 2013).

The school timetable is the artefact through which a stable network of social and material relations is created and orchestrates

> …all kinds of human and non-human actors (such as rooms) through their distinct technical affordances and constraints.
>
> (Wajcman, 2018, p.6).

Timetables assume that time is quantitative and segmentable, a scarce resource to be optimally utilised (Wajcman, 2018). As McGregor (2003 p.364) expresses it, space is articulated through time and locates students, staff and

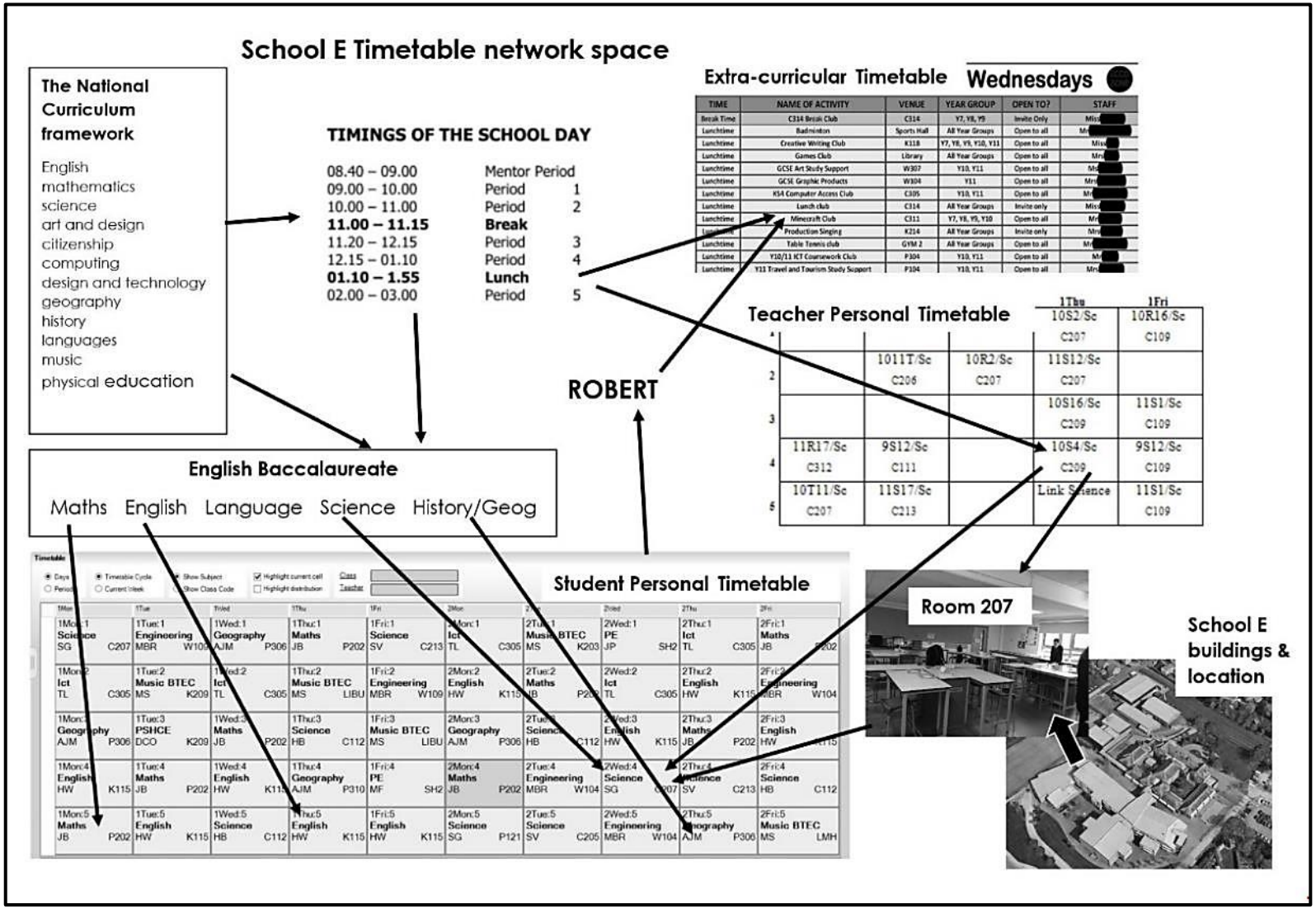


Figure 50 Organisation of time network - School E

curricula. In School E, time is segmented into class timetables, teachers' timetables and student timetables (Fig 50 previous page), in one-hour periods or slots, all of which interact to perform a students' experience of learning. The timetable participates materially in learning and engagement in digital or electronic form - on the institutional management system SIMS[39].

According to Leonardi (2010) whether artefacts are physical or digital their materiality is determined, to a large degree by when, how and why they are used. If materiality translates idea to action, materiality ceases to be merely an artefact but moves into the space of interaction between people and artefacts. Teachers and students interact materially with the timetable in different ways. Most students in School E interact with a physical, printed copy of their timetables given to them by their form mentor. Students can either copy by hand or cut out and glue it into their student planner[40], although some can access their timetable through their mobile phones. Regardless of the material form the timetable takes the pattern of relations between it and the student is one of institutional control and visible pedagogy (Bernstein, 2004) - students are not able to manipulate or change their own timetable. The timetable participates in a regional space by fixing the times and places for engagement in the curriculum. This creates distance between the teachers who create the timetable and the students who are subject to it, with teacher presence being performed as one of authority, students somewhere on the spectrum between behavioural compliance or disengagement.

In the following section I have analysed how that manifested itself in my case study school, School E. The personal timetable of Robert, the participant who will be discussed in my first example, appears in Fig 51 on the next page:

[39] SIMS is the School Information Management System, which is a student information system, currently developed by Capita and widely used in UK schools.
[40] Student planner is a pre-printed academic diary, usually customised by each school.

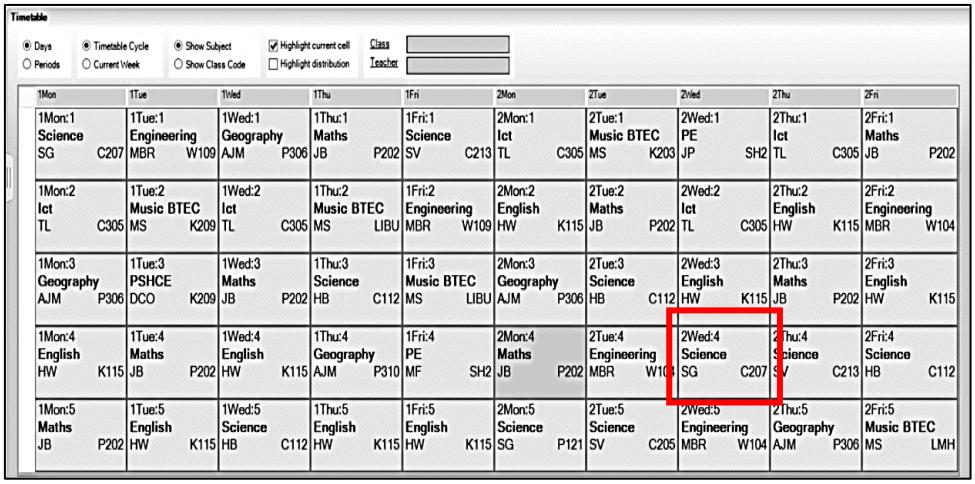


Figure 51 Robert's timetable 2017-18 (Science lesson in red square)

As already mentioned, time is segmented into one-hour slots, over a period of two weeks, at which point the cycle repeats itself. To enact his performance of engagement on Wednesdays in Week 2, in Period 4 (12.15-13.10) Robert must comply by being physically present in Room C207, for a Science lesson with teacher SG (shown in red square, Fig 51).

Sørensen (2009) points out that for a human being to take part in a learning practice, performing a form of presence is an obligatory point of passage. Student presence and the ways that participation is performed in school learning practices usually begins with regular attendance or physical/material presence in the classroom, just as engagement with gaming is performed through the virtual presence of an avatar.

The **Attitudes to Learning** poster (Fig 52) on the wall in all classrooms participates in the regional space established by the timetable. 'The Basics' section appears to relate solely to the behaviour of the human subject – the student - but it also spells out the sociomaterial components necessary for participative engagement in an ideal lesson – the equipment – bags, planners, pencils and pens in specified colours, the dress which is required and where it should be, the expectation that attendance, on time, are all necessary for engagement in learning.

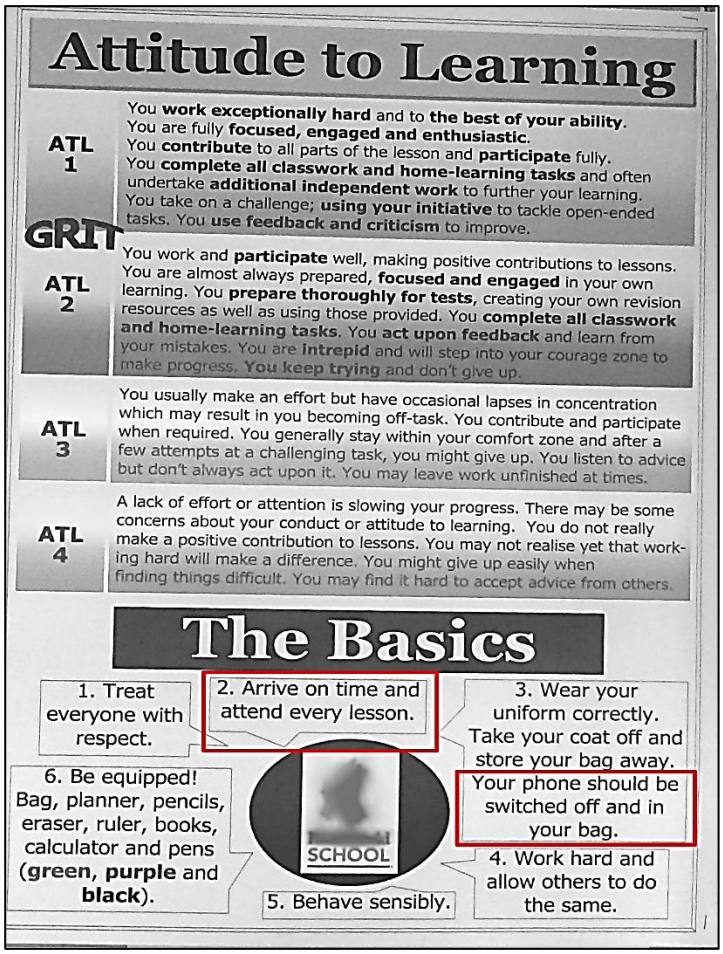


Figure 52 Attitude to Learning poster, School E

It appears that there are many ways to visibly perform disengagement, through the absence or lack of participation of any one of these elements.

How is Robert's presence affected by this timetabled assemblage of room, teacher, subject matter and the necessary material objects within the Science lesson? In my interview with Robert's form tutor/mentor he described Robert's reluctance to get involved with most school-based activities. He described him as

> …pushing the boundaries where and when he could get away with it…quite a high frequency of behaviour referrals...
>
> (Norman, Form tutor interview, 2017, Appendix 11, ll 9-11)

These are words which are commonly understood by teachers to describe non-compliance or disengagement from school expectations and norms. His mentor further remarked:

> I think he sees school as more something he has to do rather than something he takes an active role in…

and

> ...he gets in at 8.39 and leaves at 3.01 p.m.
>
> (Appendix 11, Norman, Interview extract, ll 149-150)

indicating that Robert complied minimally with temporal constraints, (the school day ran from 08.40 – 15.00) although he did not participate in the timetabled Mentor Period from 8.40 – 9.00 a.m. on the day I observed him. This seems to indicate that Robert's engagement was likely participative at best. Interestingly the Mentor period does not appear on the electronic timetable, neither do break and lunch times, suggesting that temporally, these periods of time and the sociomaterial relations within them are not valued in the same way as lessons and that a different form of engagement might be relevant. Non-curriculum time such as Mentor period is discussed later in this analysis in relation to detentions and break times.

The structuring and segmenting of time is not unique to the school setting however - most homes have informal 'timetables' in the form of parental control over mealtimes and bedtimes as was the case for Robert

> Mother - Have your tea
> Robert - What? I'm gonna finish this game off then.
> Dad - No, now
> Robert - Right I've gotta go J sorry.
>
> (Robert's audio recording, 25th Oct 2017, Appendix 11b, ll. 348-351)

Because gaming practices are enacted within fluid spaces there is the

flexibility to continue to play at a later time; to move to another physical space; to have another player or players take on the gameplay. Consequently, boredom or affective disengagement is less likely to be performed. This is not the case with learning in the classroom. To maximise learning efficiency and deployment of resources such as teachers, rooms and equipment (Wajcman, 2018) and for students to participate sequentially in learning activities, they need to be materially present at the same time, in the same place in order to acquire the same body of knowledge (Bielaczyc and Collins, 1999; Williamson, 2013). This requirement to be physically present in a specific location at a specific time is a unique characteristic and typical way of expressing engagement in formal education settings.

However, temporal requirements in formal schooling changed drastically during the COVID 19 crisis. Most students were learning online – although teachers were often setting work and working in real time with students, there was no expectation that students would work in set time periods or even on the same task at the same time. Whether and how engagement or disengagement was being enacted would be fascinating to follow up in future research. The formal organisation of time in schools, prior to the COVID 19 pandemic, is described in the following example of a Science lesson in School E.

The timetable, although not materially part of the classroom assemblage, nevertheless exerted agency over the performance of engagement within it. Robert arrived early for the observed Science lesson and remained physically present in the Science laboratory for the designated hour. Temporally at least, participative engagement (Hidi & Renninger, 2006) was performed, because this attendance was imposed by the timetable and enforced by the teacher. However, at the end of this lesson, the timetable and his mobile phone presented conflicting demands on Robert's affective and cognitive engagement. His mobile phone vibrated in his pocket about 10 minutes before the designated end for the lesson, reminding him that he was due in a Maths detention in the lunch break.

The ambiguous attitude to the use of personal devices such as phones in schools further complicates the issue. Attitudes range from the total ban of phones on school premises to the limited use of phones in classrooms for pedagogical purposes. School E allows the use of phones in lunchtimes and breaks, but not in lessons. Students are encouraged to manage their own time through the use of the electronic school timetable, ensuring that they arrive in lessons and to detentions and peripatetic lessons on time. However, most phones also contain a personal calendar which Robert had used to set the detention reminder. Wajcman (2018) notes that the co-existence of private and public apparatuses for organising time exposes the on-going power dynamics over who controls time. This incident demonstrates clearly that power is firmly in the hands of the school.

By taking his phone out of his pocket to check it, Robert visibly demonstrated affective disengagement from the lesson activities. His display of impatience and failure to give full attention to the IWB on which the final activity was displayed was further evidence. In this instance, prompt arrival at a non-timetabled activity was conflicting with an orderly end to the timetabled lesson. The timetable's role in the classroom assemblage created conflict rather than regulating relations within it. Temporally, a boundary was created where the regional space of the lesson was intersected by the networked space of the school day but was unable to be assimilated into it. Engagement in lesson time is paramount in schools. The organisation of time and how students relate to it outside of lessons plays a more ambiguous role in engagement and is explored in the next section.

4.3.2 Extracurricular time and detentions

Although not part of the timetable, detentions provide further evidence of visible pedagogy and teacher control, of the agency of the institutional organisation of time. Teachers have agency over all time spent on school

premises, including breaks and extra-curricular time,

> …the classroom before and during 'break' is quite a different space/place. Teachers draw upon this production of space to demonstrate their authority and maintain particular power relations
>
> (McGregor, 2003, p.364)

Non or extra-curricular time is supposedly organised as a more fluid social space, where students can participate in a range of activities such as socialising, eating and taking part in extra-curricular activities which are differently regulated and organised and have different sociomaterial practices to the formal lessons. Relationships between student and teacher are more flexible, as one tutor commented:

> …it's the engagement with school on another level. Seeing them, teachers - outside of a classroom setting, seeing students of like-mind from different years, different classes, and getting involved in the school as a whole… not just seeing the school as somewhere I come to Monday to Friday, periods 1 to 5 cause...the law says I have to….
>
> (Dennis, Tutor interview, 2017, Appendix 11 ll. 32-36)

Extracurricular space-time, as an assemblage, is much more loosely organised, not designed for the sequential activity described by Bernstein (2004). Although specific time slots are allocated to extra-curricular activity during the school day, the sociomaterial relations between humans and non-humans is variable. Students have more freedom of movement around a range of physical locations (see Figs 37-39) with a range of objects and technologies available. They can sit in corridor spaces, in classrooms, outside in the grounds. They can come together with others in different year groups, talk, play computer games, sports and so on. They can also drop in and out of activities as they wish, to accommodate the eating of lunch or catching of buses at the end of the day.

However, detentions, such as the one Robert attended during my observation, embody visible pedagogy and institutional control in the form of constrained activity and location. The regional space created during a detention overlaps with the more fluid arrangements of extracurricular space-time within which it exists. Although the goal of detention is officially to restore student engagement in the form of future compliant behaviour in curricular space-time, placing detention in extracurricular time might lead to students also disengaging from extracurricular activities. Their perception of their own agency in non-curricular time may be distorted and their experience of time passing slowly in detention could lead to boredom. In addition, by focusing solely on the individual human subject (the student) as the solution to compliant behaviour in lessons and regarding engagement as represented by such behaviour, other opportunities for engagement to be performed can be missed. Showing curiosity about the terrapins in the tank could be regarded as engagement in learning. If lesson time and classroom spaces were not so rigidly organised, an opportunity for engaging Robert in learning could have been taken advantage of.

4.3.2.1 Pace: the materiality of time and participation

There is a popular belief amongst teachers that pace is crucial to engagement. Increasing the speed at which activities are introduced is largely associated with improvements in student behaviour (in the form of compliance) (Sangster, 2007; Leander and Lovvorn, 2006). Bernstein (2004) pointed out that this may be because strong pacing tends to 'reduce pupils' speech and privilege teachers' talk' (p.206) but it also disadvantages more narrative communication forms prevalent at home, or in gaming.

The visual materiality of time in several observed lessons was performed through the participation of an electronic countdown timer, displayed on

the IWB, in close proximity to an analogue clock (Fig 53)

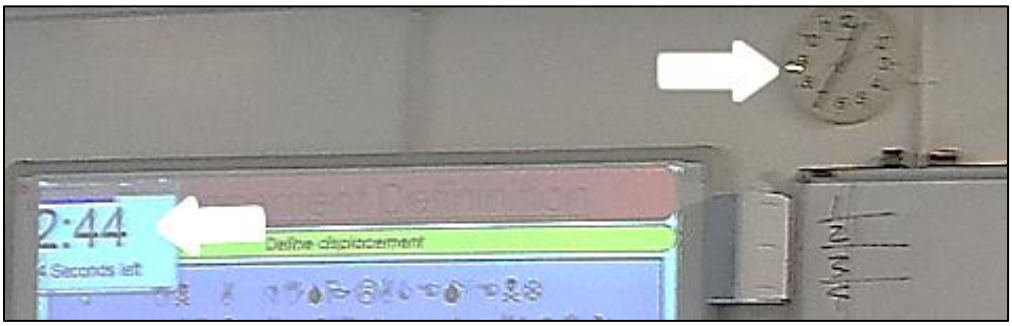


Figure 53 Clock and electronic countdown timer, Science, School E

Whilst the clock has a physical and material presence in the classroom it merely performs the passing of time. The countdown timer, which exists in digital/electronic form, similarly to the timetable, translated the ideas of speed and duration into action (Leonardi, 2010) regarding learning activities in the classroom – it regulated the length of an activity and the speed at which the lesson content was being delivered. It also constructed a space in which the IWB becomes the organising agent for visual resources, objects and human participants, even the teacher (Jewitt, Moss and Cardini, 2007).

If we regard pace as a synonym for momentum rather than speed, regulating the length of an activity may help students' affective engagement in terms of progress and task completion. This, in turn helps to avoid boredom, the perception of time moving too slowly and may prevent disengagement from the learning process as a whole. The participation of timers or time constraints in relation to lesson activities resulted in the emergence of affective student engagement in lessons observed for this study. Student focus and attention, which would be considered a desired performance of engagement, was observed to emerge less often in lessons where the timing of activities did ***not*** play a part within the allocated lesson time.

This was particularly apparent when comparing Mark, a key participant, in four observed lessons. He was observed to pay close attention to all activities in Geography where the 'pace' was maintained and strongly

scaffolded by the teacher and also regulated by a countdown timer on the IWB. In the other three lessons, where the 'pace' was largely self-regulated, Mark's relative lack of attention and affective engagement was apparent in his body language, achievement and recorded interest when interviewed. Leander and Lovvorn (2006) note a similar lack of engagement from their participant when working on coursework for individual submission.

Figure 54 Countdown timer (white square) in Rainbow Six Siege game

Countdown timers are also a feature of digital games, as is shown in Fig 54 from Robert's favourite videogame, *Rainbow Six Siege*. The on-screen timer regulated the length of the on-screen activity as Robert explains to me:

> So, you've got three minutes, in that three minutes you've got either 2 or 5 enemies… when it gets to 3-3 it goes into overtime.
>
> (Robert's game commentary, 2017, Appendix 11b, l.96))

The game timer seemed to support player engagement in a similar way to the classroom timer, in the sense that it enabled accomplishment in terms of achievement, completion and progression to be performed. Similarly to the classroom, a sense of momentum was created, as players worked together to achieve their goal which was displayed on the screen as 'Protect the

objective'. The goal was imposed by the game countdown timer as it was indirectly by the teacher in the classroom but did not create the same sociomaterial relations.

In the classroom the timer was part of authoritative teacher presence, on the IWB, creating a regional space with distance between teacher, timer and students in the class and affective engagement through competition between students to complete the activity quicker than their peers. In *Rainbow Six Siege* fluid and regional space intersected - human participants, the player and their team, were working collaboratively but competitively as part of a collective activity which the timer was regulating. There was close visual proximity between timer and player activity, as shown on the game screen (Fig 54) with engagement emerging in the form of focus, attention and a sense of progression. Loss of focus, attention and/or lack of progress can emerge as disengagement whether it takes place in the classroom or the videogame. Importantly, however, human participation in a multiplayer gaming space can continue flexibly despite such disengagement. Presence in gaming environments is optional – team members can compensate for the weakness of others or take over from each other, rounds can be replayed until a desired outcome is reached. This is not the case in the classroom. This inability to 'replay' and engage and re-engage in activity in classrooms can lead to boredom. I explore the idea in more detail in the next section.

4.3.3 Reflection: Replays, demos and D.I.R.T

Just as the countdown timer provides momentum and a sense of progress towards a goal imposed by the teacher or game, the demonstration (in school) or game walkthrough (in games) ensures that momentum or progress is maintained by showing students/players the 'correct' sequence of events needed to perform an action. In the 'demo', a teacher will demonstrate a

practical activity such as a Science experiment, how to play a piece of music or how a piece of code might be written and operate. This tends to happen in a regional space, in a one-to-many relationship. Students participate by focusing their attention on the teacher and objects under the teacher's control.

In a game walkthrough or streaming game session which other players post on YouTube, Discord[41] or other gaming platforms, space is fluid – players are present both physically and online and can choose to watch a section of the game being played by a peer, either in advance of playing it themselves; after playing the game but failing in a task; or simultaneously alongside their own play session. Because these walkthroughs are performed by 'peers' they are less intimidating than the teacher demo, and they are also framed as suggested rather than prescribed ways to tackle an activity. Demos in formal learning sessions such as Science, Computing and Music lessons were framed as the 'correct' way to tackle an activity and were not available in advance or to be 'replayed' after the lesson. Activities in games are often not linear or sequential – they can be tackled in any order as the player wishes. School activities are highly linear and sequential and regulated by the teacher. The affordances presented to students through teacher demonstrations limit their agency, their ability to engage with relevant material and manipulate it to suit their needs. No student was ever observed to ask a teacher to repeat part of a demonstration or to clarify any aspect of the procedure.

The organisation and regulation of time played an important part in activities designed for participants in both games and classroom learning. The ability to learn from experience or previously performed actions, in the shape of in-game replays and in School E, Dedicated Improvement and Reflection Time (D.I.R.T) sessions, discussed in a later section.

[41] Discord is a freeware instant messaging and VoIP application and digital distribution platform specialising in text, image, video and audio communication between users in a chat channel. It is used heavily by the gaming community.

Replay is an affordance offered by most digital games, which is widespread and accessible, giving players the opportunity to learn both from their own mistakes as well as the expertise of others. A 'replay' visually captures past actions performed by the gameplayer who can choose to watch the replay at a time of their choosing, can slow it down, stop it at certain sections and repeat them until they have worked out where they went wrong. New temporal framings used in the analysis of gameplay (Zagal & Mateas, 2015) such as real-world time, gameworld time, coordination time, and fictive time emphasise the importance of analysing the relations between different flows of time and how they create affective engagement in players. Davies (2009) suggests that well-paced game levels which engage should provide moments of action interjected with calm – replay affords moments of reflection and calm.

The players I observed were happy to take part in this self-reflective process online – Robert's playing partner, J, expresses his dissatisfaction when the replay affordance is compromised,

> J: I can't even watch the replay
>
> (Robert's game commentary, 25th October 2017, Appendix 11b, Transcript 1, l.117)

whereas students appeared disengaged from similar processes in the classroom. I explore this apparent disengagement in a series of observed reflection lessons labelled D.I.R.T. or Dedicated Improvement and Reflection Time. I observed three D.I.R.T lessons during my fieldwork, as part of my participants' school day and all three students appeared disengaged and disinterested, whether they were normally engaged in lessons or not.

It should be noted that these sessions were intended for 'improvement' and 'reflection' and were a mixture of formative assessment and what Schön (1983) called 'reflection-on-action', that is reflection which happens after the

event and leads to changes in the future. Torrance (2017) suggests that because formative assessment such as this is heavily influenced by external assessment criteria, the main concern is with how these criteria can be met rather than a genuine opportunity to learn from one's own mistakes and make progress.

D.I.R.T sessions were triggered by the return of a piece of assessed work rather than self-recognition of failure to achieve a goal or acquire a skill in a digital game. Student responses to teacher feedback were required in a form that would 'readily translate into performance indicators…' (Bernstein, 2004, p213). Instead of students choosing to focus on self-identified misunderstandings or failings, the teacher used a set of assessment criteria (see teacher feedback in Fig 55) to produce a list of weaknesses which the student was encouraged to address on a pro-forma. Teachers themselves identified these lessons as 'boring' (CL, Informal chat, October 2017) because of the constraints imposed by the assessment criteria and the formulaic nature of the activity.

In one such D.I.R.T session in English, the students were given back a piece of writing which the teacher had annotated (Fig 55 middle). Students were then supposed to rewrite their poem based on this feedback. Recognisably based on Biesta's (2015) technological view of education, or an example of visible pedagogy (Bernstein 2004), students were directed to use a purple pen to respond to teacher comments, written in green pen on their written work and on a separate feedback sheet (Fig 55 far right). The pens, and the allocation of specific colours for teacher and student (Fig 57), demonstrate the belief in a direct relationship between input and output, within a closed system (Biesta, 2015).

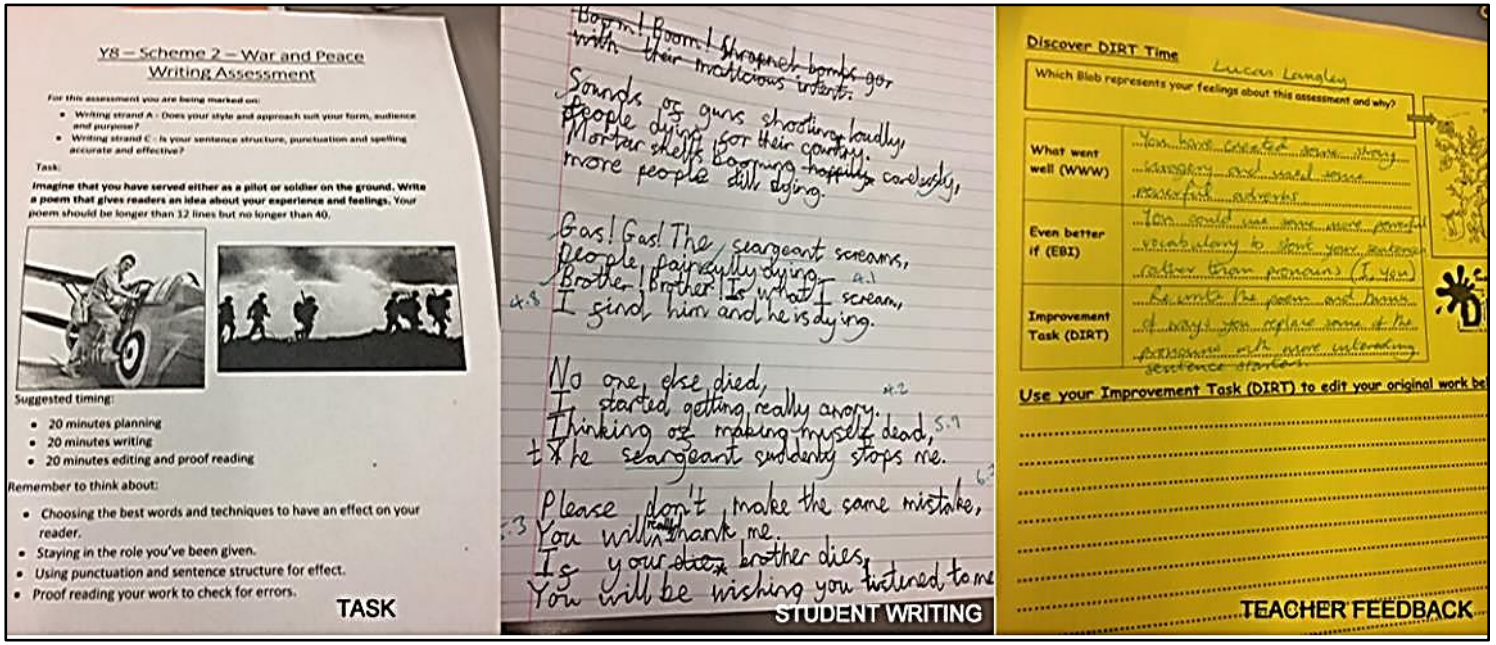


Figure 55 English D.I.R.T proformas (L to R)

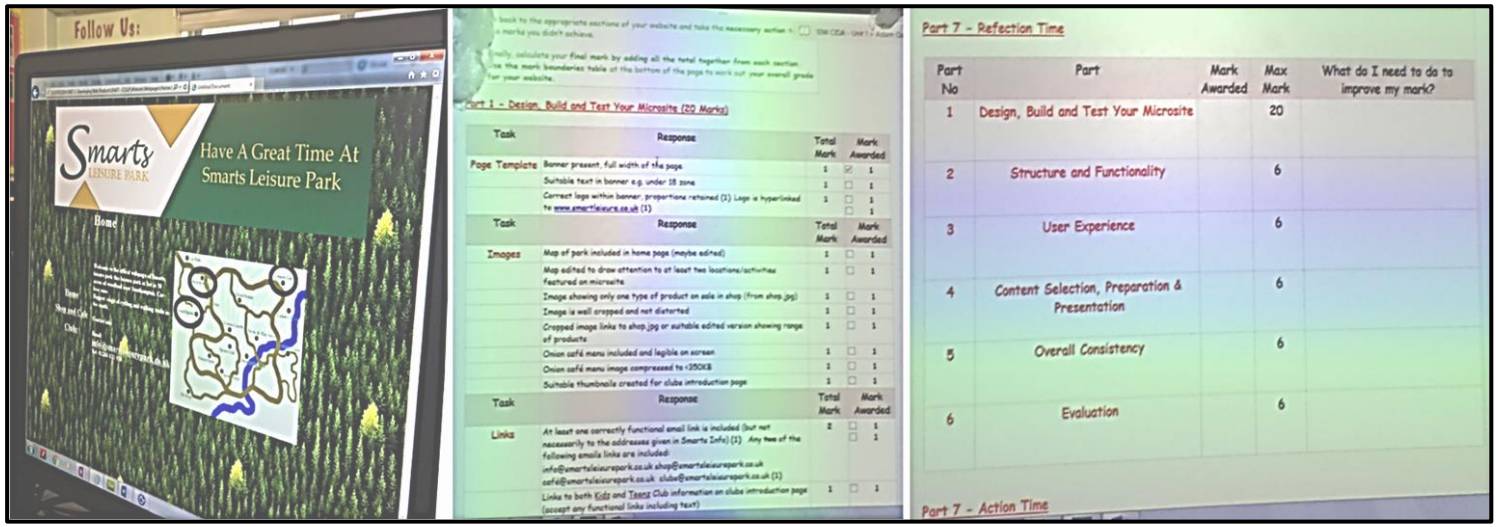


Figure 56 Computing task/OneNote evaluation proforma

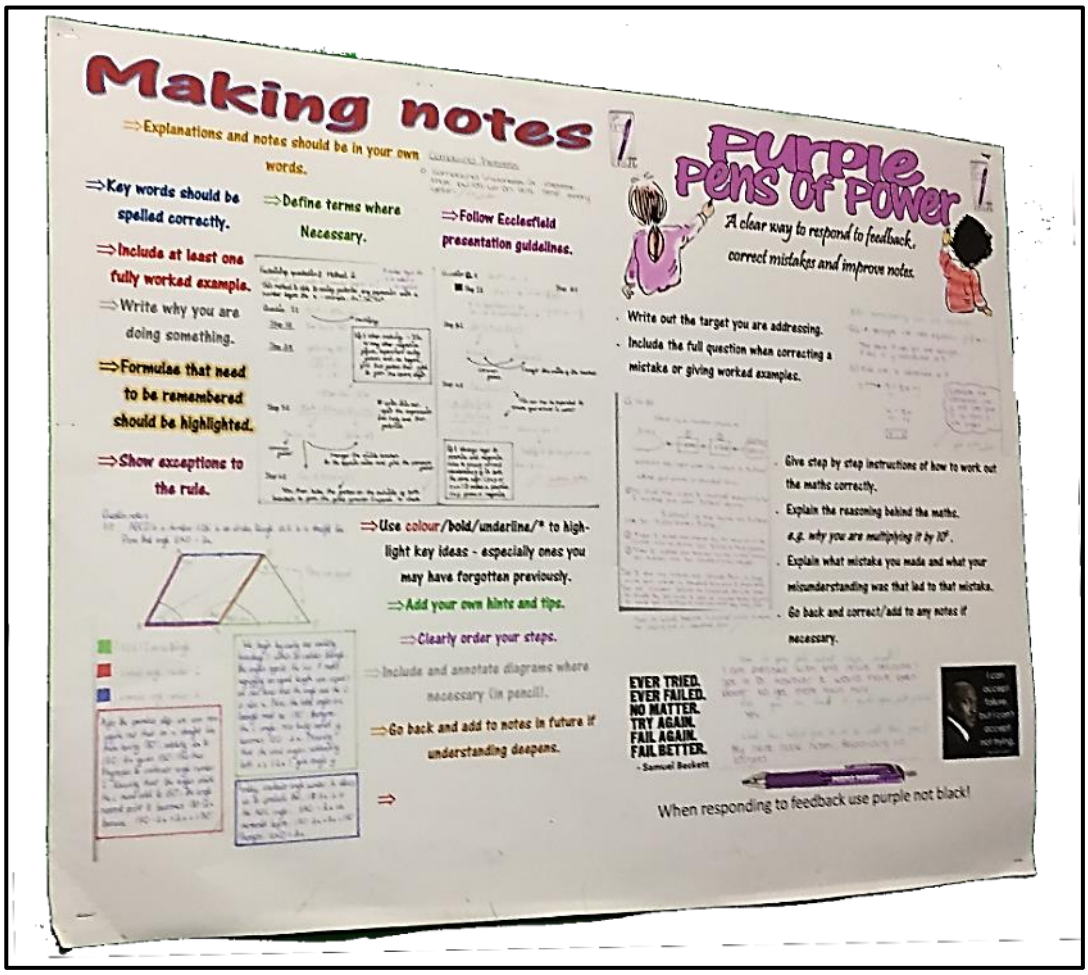


Figure 57 Making Notes poster

This example of an entrenched practice emphasised the power relations in play. The materiality of using a pen and paper to respond is prescribed in minute detail (Fig 57 - Purple Pens of Power). Students following these guidelines are seen to be materially 'engaging' or participating in learning and although it is still possible to participate in a learning 'event' or activity without adhering to these guidelines, to lack more than one or two of these components would suggest disengagement to a teacher,

> …someone who's engaged will…be writing an answer to the thing they'll be studying or creating something that's linking to the thing we're doing
>
> (Ruth, English teacher, Interview 1, 2017. Appendix 11, l.119-20

Although the teacher encouraged students to read out their 'corrected' poems towards the end of the session, this was very much a rushed afterthought with no genuine discussion of the results. The feedback practices were entrenched through the paper proformas (Fig 55) which were used, and which exercised the most powerful agency over sociomaterial relations in D.I.R.T sessions.

In contrast, in an observed ICT lesson, a bespoke reflection activity, created by the ICT department seemed to produce less disengagement than the D.I.R.T sessions. Rather than paper proformas, students were asked to complete an on-screen scoresheet, to self-evaluate their own website designs which were also on-screen (Fig 56). The affordances offered by the digital scoresheet were similar to the in-game replay session. In a game replay the player watches their own actions as they happened, identifies their own weaknesses and mistakes from the direct consequences on the screen and is able to select appropriate resources and tactics for an immediate re-run of their activity. Agency remains with the player rather than with a teacher since the effect of any corrections they make to their play are immediately visible on the screen, affectively engaging the participant. In theory students were able to identify weaknesses in their website designs and take immediate action to improve them. However, in practice, the criteria they were using to evaluate their design were externally imposed, from the examination board, performance indicators, as referred to earlier.

4.3.3.1 Time as sequential activity

Writing is the preferred method of communicating engagement and learning in formal contexts. This is constantly emphasised by teachers, by the displays (Fig 57 and 58), by the many objects related to this activity in schools, such as exercise books, worksheets and so on.

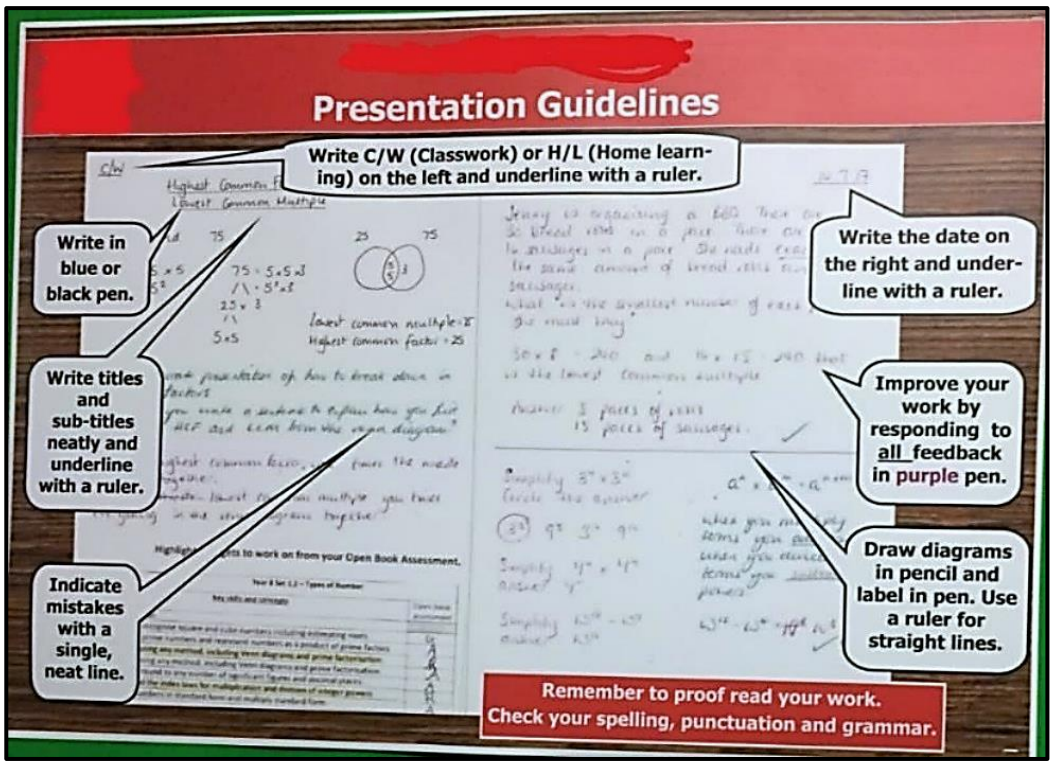


Figure 58 Presentation Guidelines poster, School E

Although the Computing reflection activity had the same restraints as the official D.I.R.T sessions, that of externally imposed performance indicators, the digital affordances of the keyboard rather than the pen seemed powerful in producing engagement in participants such as Stuart, who had particular problems with writing (Fig 59)

Three of my five core participants had poor or very poor handwriting (Fig 59) manifested by poorly formed letters, non-cursive style and in the case of Stuart and Dylan, illegible to themselves and others.

> …when I ask him to read it back he can't even read his work back sometimes.
>
> (Sylvie, Dylan's key worker, School E, October 2017, Appendix 11, l.37-38)

Students with particular needs such as Dylan and Lucy (both dyslexic) could even find the physical act of holding a pen and writing painful,

> …if you just continuously just writing essays…you have to stop in the middle cos your hands always hurt so it's easier…if you use computer…
>
> (Lucy, *Minecraft* Club interview, School E, June 2017, Appendix 11c, l.93-94)

This greatly hampered their ability to participate in the prescribed manner required in the majority of lessons. Despite the value attached to writing even teachers acknowledge that the act of writing can be boring and disengaging for students. Teachers across the four schools made similar comments:

> I do feel sorry for my Year 11s because they are pretty dis-engaged, and I think it's because it's repetitive use of writing over and over and over again…" (Ruth, Interview, School E, April 2017, Appendix 11, l.161-162)
>
> "Writing long passages disengages but we have to do that for exams…
>
> (JT, Interview, School S, June 2016, Appendix 11, l.38)

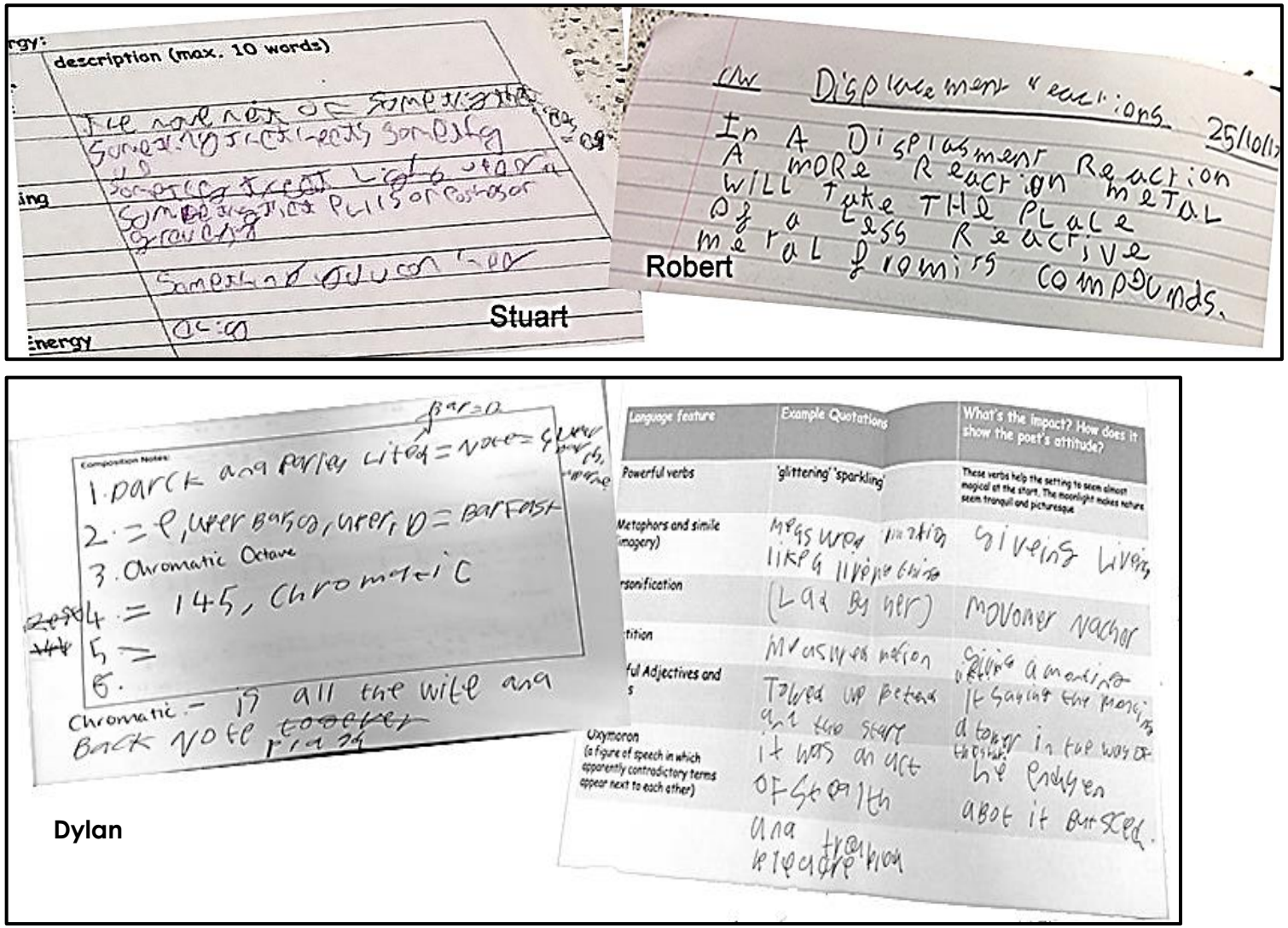


Figure 59 Examples of core participants' handwriting

In contrast my other two participants, Lincoln and Mark, who were generally regarded as more academically engaged students, had much better handwriting as can be seen in Fig 60. The letters are well formed, clear and consistently sized, sometimes cursive and legible.

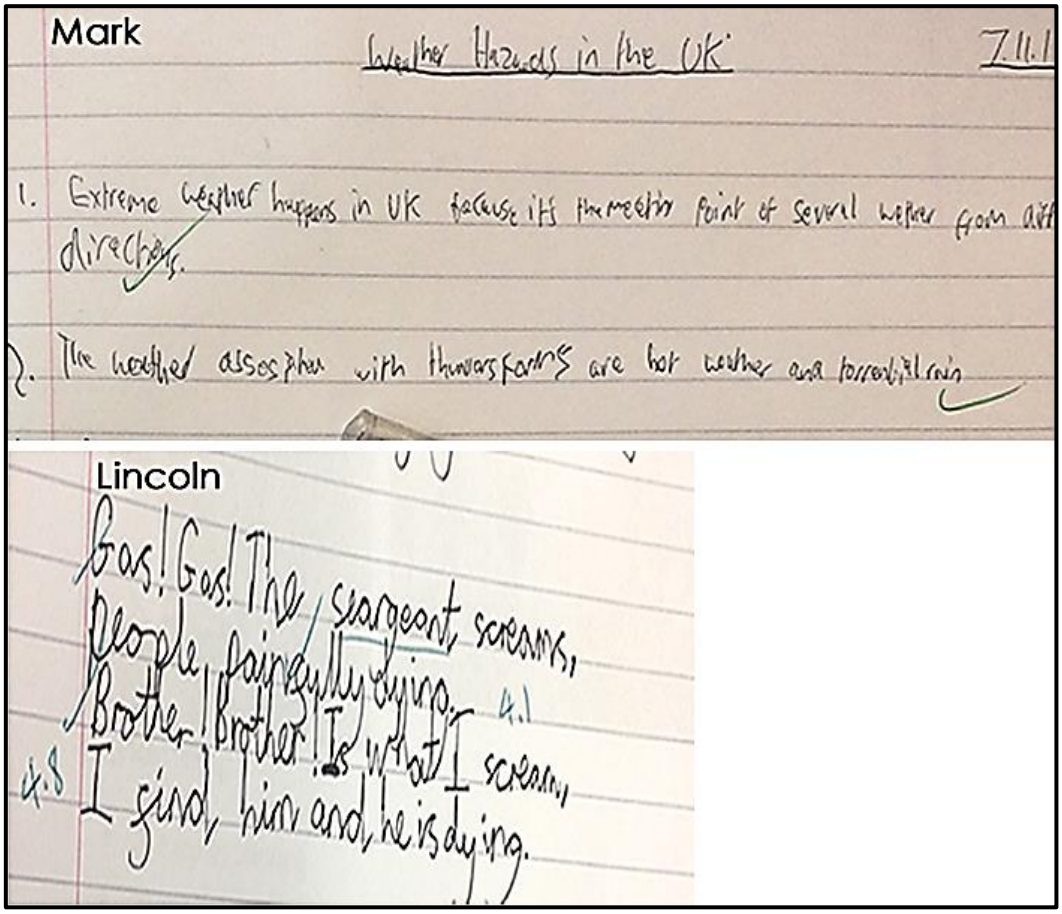


Figure 60 Examples of engaged students' handwriting

It may be worth considering, therefore, that the many objects related to handwriting such as exercise books, paper pro-formas, posters and the assessment criteria which ascribe value to written responses, are creating sociomaterial relations which in turn produce disengagement in particular students by placing constraints on embodied means of participation and engagement.

4.4 Summary

In this chapter I began by considering how the notion of school as a space is generated through the assembling of unique characteristics such as physical architecture, furniture and wall displays, which inscribe the power relations that regulate participation and distribute agency, creating an affective atmosphere for teachers and students.

Space and time are organised in schools to perform relatively stable and patterned ways of enacting engagement, often in the form of attendance, compliance and attention in lessons. Artefacts such as seating plans and timetables organise and regulate movement and participation in lesson activities. In order for a student to take part in a learning practice, they must perform a form of presence. Presence manifests through the embodied participation of humans in a space, in physical attendance in the classroom, as engagement with gaming is performed through the virtual presence of an avatar. Presence is also performed through the roles which human actors take in classroom as I discuss in section 5.1.1.1 where students take on the role of expert in *Minecraft* lessons.

I have used Sørensen's (2009) concept of 'zones' in the classroom to describe relations between actors in an assemblage as regional or 'teacher' zones, which create a one-to-many relationship between students and teachers. Artefacts such as lesson booklets and technology such as the IWB are also part of these zones and help to create these relationships. Teacher zones focus attention on the teacher and the IWB, allowing the performance of expected patterns of engagement in the classroom. The IWB can also be used to create a sense of momentum, in the form of electronic countdown timers and multi-modal affordances such as sound and image, creating and maintaining affective engagement. However, too often the teacher zone restricts opportunities for students to participate or have agency in classrooms. The IWB presented limited affordances to students to participate actively in their own learning, since they had no ability to manipulate

information, search for more information independently or multi-task as they might expect to do during a gameplay experience. This was illustrated in the description of the terrapin tank in Robert's Science lesson, which was in contrast to a *Rainbow Six Siege* gaming experience where Robert was able to access information about a 'lagging glitch'. The seating plan regulates movement in classrooms which is usually tightly constrained – when movement was available as a way to participate in the Cryptography lesson discussed on page 250, it generated much affective engagement.

The specific temporal constraints imposed by the timetable meant that activity which took place in lesson times was valued more highly than extracurricular time, during lunch and after school, as was demonstrated by conflict between student attention in a Science lesson and prompt attendance at a detention. Detentions, designed to increase engagement in lessons, took place in lunchtimes, disrupting the more flexible relations between students, teachers and their embodied participation in the school environment. This disruption was caused by the teacher re-asserting agency in a time period when teacher-student relations were less hierarchical.
The constraints of the timetable and the assessment criteria also meant that learning tasks were, by necessity sequential, with set periods set aside for learning to be achieved and demonstrated. School practices and assessment criteria reduced students' demonstration of engagement largely to written responses, which were very highly valued compared to other forms of engagement. This high value was emphasised by wall displays and constant verbal re-iteration.

In the next chapter I move on to consider the extent to which digital gaming practices offer a productive contrast to those of the classroom and whether they can help us understand boredom and engagement.

Chapter 5 GAMES: ASSEMBLING ENGAGEMENT

5.0 Introduction

Just as school tends to be regarding as 'container', digital games themselves can be seen as black boxes, tools or objects subject to manipulation firstly by the designer and secondly the player. As already discussed in the literature review, educational research tends to frame games and gaming practices in two ways; as 'games *for* learning' and 'games *as* learning' (Duncan, 2016). The former assumes a distinctly interventionist view of games, where the properties of games are used for educational purposes. The latter frames games as systems within which learning activities and practices are embedded, becoming critical tools from which formal learning practices may benefit. Duncan (2016) advocates for a third framing 'games with learning' which combines the use of games to critically evaluate existing instructional approaches in school with the ability to incorporate elements of good game design into formal learning practices. Each of these framings assumes to a greater or less extent, that games are tools to be used by human agents for specific goals rather than having potential agency within the assemblages of which they are an element.

In a sociomaterial approach however, the gameplay experience itself would be seen as an embodied activity, constructed performatively in a moment rather than an image on a screen, that we simply look at. Games include activities which involve spatial movement and orientation which become 'affective territory' (Ash, 2009, p.2108) in which the screen has affordances which in turn relate to the capabilities of the human actor and create affects. This chapter explores the relationship between different physical spaces or contexts within which humans, objects and technology are entangled when playing games in both educational and non-educational contexts. In schools, spatio-temporal relations tend to be stable - time is

regarded as linear and sequential and space as regulated and organised by artefacts such as the timetable. In contrast, space and time in games and gaming activity are seen as being constructed around the activity and engagement of the player. The lack of stability and mobility of relations leads to a different affective atmosphere to the classroom.

As discussed in the methodology section, my analysis of gaming practices is event-based. Each event contains multiple elements which contribute to affective engagement in gaming. Although Duncan's (2016) framings of educational approaches to games may seem to preclude a sociomaterial approach to gaming practices since they assume the separation of player and game, they provide a structural basis for organising a series of complex analyses of gaming activities and for re-evaluating current approaches to gaming in educational research. The three framings, as discussed in my review of the literature, are: games for learning, games as learning and games with learning.

In section 5.1 the 'games for learning' framing is used to consider the extent to which the digital game *Minecraft* can be seen as a boundary object in English lessons and the effect that this might have on engagement.

In the second section which is loosely organised around the concept of 'games as learning', I return to the structure of Chapter 4, comparing the student experience of playing games in both classroom and home settings and how time and space is organised to produce affect. I move on to compare firstly spatial organisation and then temporal framings in games within home gaming environments and classroom spaces which engender practices that in turn, produce different performances of engagement from the classroom.

In the final section, 5.3, I conclude by discussing whether the dominant practices of the classroom can be disrupted or become more flexible through the third framing suggested by Duncan (2016), that of 'games with

learning' and whether such an approach is capable of preventing boredom and creating affective engagement.

5.1 Games for learning

In a 'games for learning' perspective, games are seen as tools to move us toward valued practices which are not related to play. Games are objects which can be used to capture interest and engagement, but ultimately, vehicles for directing students towards serious learning goals and achievement (Duncan, 2016). The assumption, in such a framing, is that objects such as games do not have agency and are subject to the manipulation of powerful human actors such as teachers, when used in classroom spaces. In this section I consider whether regarding the digital game *Minecraft* as a boundary object (Shields, 2013), rather than a tool, could be argued to create engagement by remaining recognisable across different situations and enabling students to make connections between knowledge acquired in school and out-of-school.

5.1.1 Games as boundary objects - *Minecraft*

Whether a digital game could be considered an object depends on the perspective taken. In education, games have traditionally been regarded as such, specifically within a 'games for learning' framing, where the primary consideration is what might be 'done' with games (Duncan, 2016) in terms of achieving educational goals. In that sense, the role of *Minecraft* can be compared across different situations such as the lunchtime *Minecraft* club and a series of English lessons in School E as well as in the home gaming context. For students, *Minecraft* provides a sense of continuity and cohesion, encouraging them to make connections between what they know for themselves and what they are being taught in the classroom. Within the

formal learning network which dominates most school settings students are rarely able to enact 'expertise' or have their gaming capital valued. Iacovides (2014) posits that this has a significant effect on students' interest, confidence and engagement. Engagement or disengagement in gaming, as opposed to formal learning, can be enacted in a number of ways, with expertise in building and operating in the *Minecraft* virtual world becoming a form of social currency (Dezuanni, O'Mara & Beavis, 2015, p.149) in the *Minecraft* community. This theme is picked up in section 5.1.1.1 where I discuss how *Minecraft* enables students to play the role of experts in the classroom, disrupting the hierarchical relationship between teacher and student and encouraging students to make connections between their own knowledge and knowledge gained in the classroom.

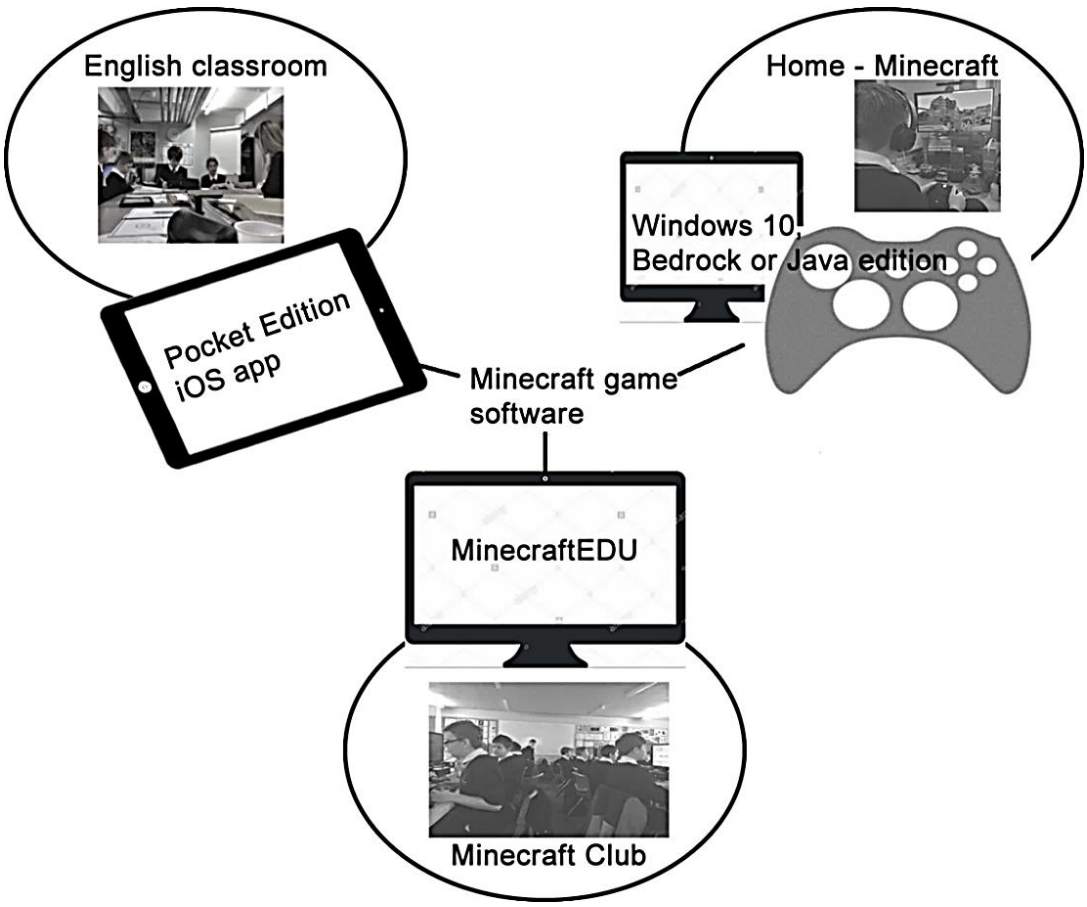


Figure 61 School E Minecraft software/hardware network

Most data relating to the *Minecraft* game (software) was collected within School E rather than in a home gaming environment. *Minecraft* became part of the network space of school, through schooled devices (Burnett, 2017) such as iPads and PCs. The *Minecraft* game software existed as an object embedded in a network of practices and spaces and enacted differently depending on the other objects, such as lesson booklet, classroom environment (shown in Fig 63) in that assemblage or network. In English lessons, which took place in a non-specialist classroom, the commercial version of *Minecraft*, was accessed via the iOS app on a set of iPad devices. The teacher regulated access to both the iPad devices and the *Minecraft* virtual environment. In contrast, in *Minecraft* Club, students had open access to the *Minecraft*EDU software on PCs in a 'computer lab'. At home participants were able to access other versions such as *Minecraft* Java Edition and Windows 10 Edition through Xbox, PS4 and PC which enabled them to manipulate the software by coding some of their own gameplay experiences.

In the series of English lessons, the iPad and *Minecraft* Pocket Edition provided students with different affordances to either the Windows 10 or *Minecraft*Edu versions which are played on a PC. Within the English classroom setting *Minecraft* was very much a 'game for learning'. The iPads which students used to enter the *Minecraft* virtual world, became what Burnett et al. (2017) calls 'schooled devices' (p.20), just one amongst many objects which make up official school 'stuff' such as booklets, pens and exercise books, as illustrated in Figure 62. iPads helped constitute 'school-work' which generates material outcomes such as poems, worksheets and so on and physical embodiments of educational activity as 'individual and sedentary' (Burnett et al., 2017, p.32).

Figure 62 iPad and other Minecraft lesson 'objects'

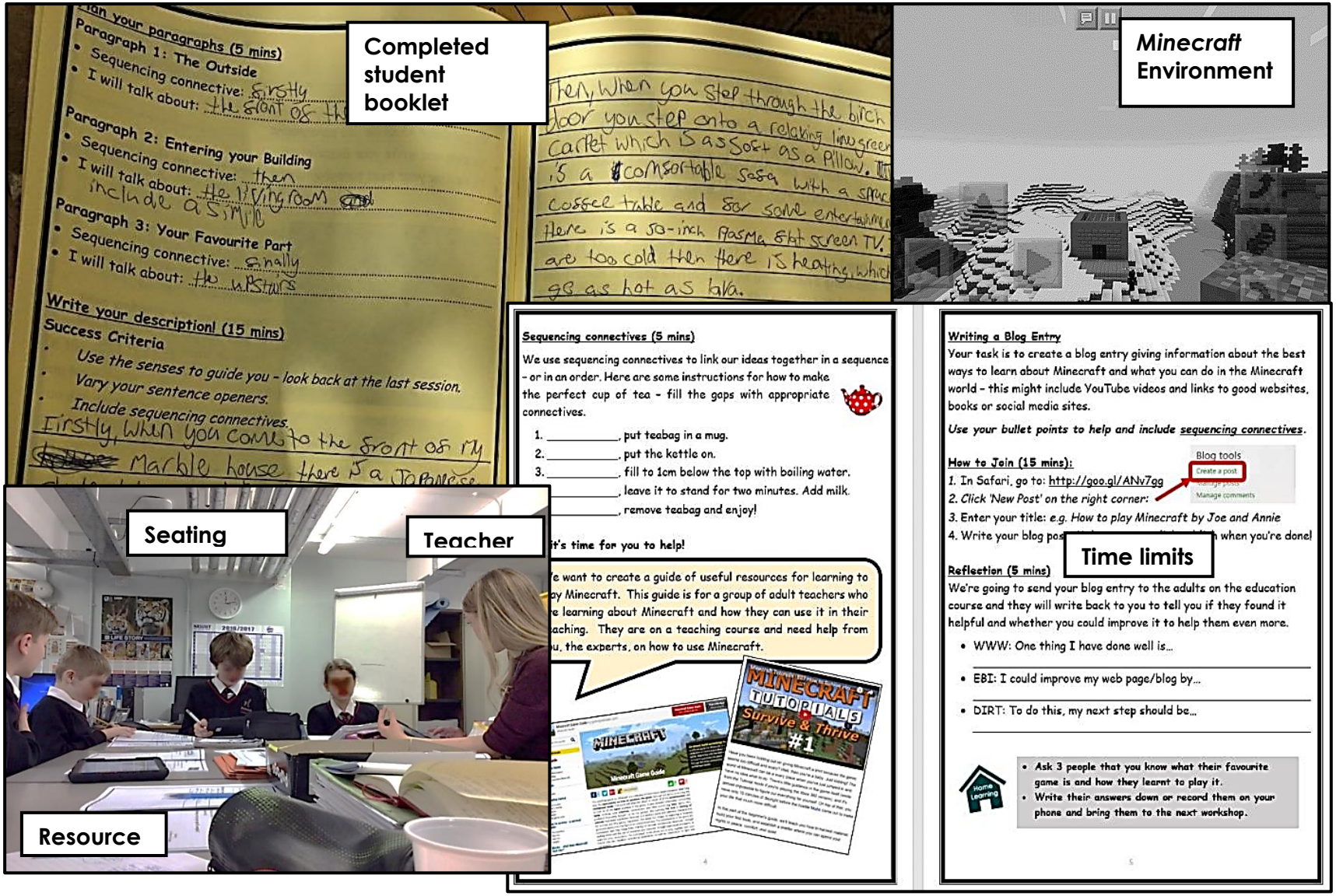


Figure 63 English/Minecraft classroom network

Sequencing connectives (5 mins)

We use sequencing connectives to link our ideas together in a sequence – or in an order. Here are some instructions for how to make the perfect cup of tea – fill the gaps with appropriate connectives.

1. _____, put teabag in a mug.
2. _____, put the kettle on.
3. _____, fill to 1cm below the top with boiling water.
4. _____, leave it to stand for two minutes. Add milk.
5. _____, remove teabag and enjoy!

Now it's time for you to help!

We want to create a guide of useful resources for learning to play Minecraft. This guide is for a group of adult teachers who are learning about Minecraft and how they can use it in their teaching. They are on a teaching course and need help from you, the experts, on how to use Minecraft.

4

Writing a Blog Entry

Your task is to create a blog entry giving information about the best ways to learn about Minecraft and what you can do in the Minecraft world – this might include YouTube videos and links to good websites, books or social media sites.

Use your bullet points to help and include sequencing connectives.

How to Join (15 mins):

1. In Safari, go to: http://goo.gl/ANv7gg
2. *Click 'New Post' on the right corner:*

3. Enter your title: *e.g. How to play Minecraft by Joe and Annie*
4. Write your blog post. Make sure you click publish when you're done!

Reflection (5 mins)

We're going to send your blog entry to the adults on the education course and they will write back to you to tell you if they found it helpful and whether you could improve it to help them even more.

- WWW: One thing I have done well is…
- EBI: I could improve my web page/blog by…
- DIRT: To do this, my next step should be…

- **Ask 3 people that you know what their favourite game is and how they learnt to play it.**
- **Write their answers down or record them on your phone and bring them to the next workshop.**

5

Figure 64 Minecraft booklet sample pages

Rather than contributing to a more 'fluid and emergent teaching and learning practice' (Meyer, 2014 p.19), through affordances such as mobility, and tools such as camera, audio and so on, iPads tended to participate in and contribute to maintaining established ways of learning, acting as extended official class texts like the *Minecraft* booklet (Fig 64) used in these English lessons. *Minecraft* was able to exist within the network space of school because it was assimilated within the timetable and lesson structure. It also intersected the boundaries between regional and fluid space – students were the experts in the virtual *Minecraft* world - the iPads had the potential to contribute to students' performance of authority in relation to the teacher.

By including *Minecraft* in the formal classroom environment, the intention was to enable students to make connections between what they knew for themselves and what they were being taught in the classroom. In this situation students briefly had the illusion of more agency, taking on the role of experts. The affordances which enabled such expertise to be enacted included the iPad and touchscreen, the *Minecraft* virtual world and the students' knowledge of gaming practices. Such affordances can create non-hierarchical relations between adults and children – what Sørensen (2009) would call 'presence' - and change the nature of affective engagement. Presence refers to the

> …spatial arrangement of social and material entities through which certain ways of participating are made available. (p.138)

The lesson (Appendix 13) analysed in this section took place in a non-specialist classroom, normally designated for Technology, with furniture and equipment associated with that curriculum area. Students sat around a central table, with the teacher and researcher sitting alongside them as illustrated in Figure 65. The teacher and students co-constructed their 'presence' in the sociomaterial interactions of the lesson (Sørensen, 2009).

Figure 65 Teacher/student seating arrangements

Students' agency was emphasised by the teacher enacting a 'non-expert' role in relation to the students and technological elements in the classroom such as the iPad device and the *Minecraft* game screen. By attributing the role of expert to students, the *Minecraft* game altered the pattern of participation and power relations - the technology, in the form of both iPad and *Minecraft* virtual environment, created an alternative assemblage and the affordances and constraints to perform a different form of engagement. In the formal school setting a regional space was created, one in which the teacher inhabited the physical world of the non-player and non-expert and students the virtual one in which they were the experts in both the virtual *Minecraft* world and in their control and knowledge of the iPads, contributing to students' performance of authority in relation to the teacher. This was much closer to their experience of *Minecraft* in home gaming where parents position themselves as learners and allow children to assert authority in gaming interactions (Gee, Siyahhan and Cirelli, 2017). Whilst other adults do participate in interest-based gaming groups outside of school, they are 'not automatically resident experts by virtue of their age' (Ito et al., 2008, p.2). However, they do have an important part to play – young people see adults as experienced peers rather than authoritative figures, people who have influence in setting 'learning goals' (ibid p.3). In the context of informal

learning and gaming at home young people benefit from apprenticeship relationships in gaming affinity groups (Bricker and Bell, 2012; Kupiainen, 2013). Although unrelated to digital games, one of my participants, Charlie, remarked on a similar learning relationship which he shares with his grandfather,

> I'm one of those people who like tinkering with things so…I used to spend quite a lot of time with my Grandpa's…he was always in the shed and I used to help him quite a bit… (l.310-314)

and later refers to his preferred teacher-student relationship,

> …Computer Studies it can be quite hard and like complex so they're always there…if you need help, they understand …"
>
> (Charlie, School E, Interview July 2017, Appendix 11c, ll.356-357))

Ito et al. (2008, p.1) raise questions about how young people's practices around gaming and new media might change the dynamics around learning and authoritative knowledge. Certainly, for a short period using *Minecraft* in this English lesson enabled students to become immersed and affectively engaged in the experience of exploring the virtual world and demonstrating their own knowledge. In the *Minecraft* virtual environment, students' performances of engagement were more varied since their agency seemed free from culturally restrictive actors such as 'assessment'.

However, the traditional regional space in the classroom was quickly restored through the agency of the lesson booklet, where the form of student participation and presence is non-negotiable and engagement performed by compliant behaviour and academic ability – in this case, their ability to write a series of instructions in the time limit imposed. Academic ability here means demonstrable and conventionally understood academic ability.

Although these students may have been seen to be lacking 'academic ability', this may be because they did not **perform** it in ways that the system conventionally demands and expects.

Minecraft, rather than existing through the gameplay experience, existed on the pages of the booklet as a means to achieve instructional goals – a game for learning. As my field note demonstrates, this had a direct effect on students' engagement with *Minecraft* in this situation:

> The attitude of the children in the English class has changed from excitement and anticipation to weariness and acceptance as they've realised that the 'intervention' is just more of the same kind of activity they presumably do in their normal English lessons.
>
> (Field note, March 2017)

The stated goal for the English Intervention *Minecraft* lesson series was as follows:

> By the time, the end of the cohort, they should be able to use paragraphs, use discourse markers in their writing and also organise their thoughts and words in a piece of writing for effect, as well.
>
> (Ruth, Teacher interview 2, April 2017, Appendix 11, ll.18-20)

The very specific literacy goals of the six-week English lesson series were at odds with the nature of activities and participation usually associated with the playing of *Minecraft*. Although I had volunteered to develop the lesson activities, the lack of communication between the teacher and myself resulted in a series of activities which did not allow the development of collaborative narrative (Schifter and Cipollone, 2013) for which *Minecraft* group activities are ideal, and which might lend themselves to literacy skills. I have discussed this process in detail in Section 3.3.4.3.

When commenting on the aims of the lesson series and my adaptation of the booklet, the teacher organiser said:

> I've altered the document to fit our intervention programme – the students selected need to work on their knowledge of using structural features for effect, so I've simply adjusted some of the sessions.
>
> (Ruth, English teacher, email, Feb 2017, Appendix 14)

These adjustments meant that the teacher of the lesson I observed did not start within the *Minecraft* environment but with the booklet (Fig 60) which framed the activity as a writing activity rather than a gaming experience. In this sense, then, *Minecraft* did not act as a 'boundary object' as I had intended when proposing its inclusion in this lesson series. Further, the affective engagement I assumed would be generated by assembling iPad, *Minecraft* virtual environment, students and teacher did not produce a lasting change in the relations within the classroom assemblage. My theory is that existing literacy practices, particularly those associated with writing and handwriting, are so stabilised and entrenched that simply including different elements, in the form of the iPad and Minecraft game, in the assemblage was not enough to change practices which might produce engagement rather than boredom. I discuss the practice of writing and the relations which produce it in the next section.

5.1.1.1 Literacy practices in the English classroom

Writing is the preferred method of communicating engagement and learning in formal contexts, largely because it is the concrete product of the learning process which will be assessed.

As Sørensen (2009) found in her study, the booklet, which also served as an exercise book, in that students wrote in it (Fig 58) as well as following its instructions, 'defined a clear standard for the sequence of the children's work' (p.26).

As an actor in the lesson assemblage, the booklet was the 'focusing feature' which exerted the most power in the network). It generated a material outcome and as Burnett et al. (2017) phrases it, was the physical embodiment of educational activity which is seen as 'individual and sedentary'. The seating plan in the non-specialist classroom, with teacher and students being around one table (Fig 66), changed the spatial relationship between teacher and students. Since the usual teacher 'zone' near the board was not available to her (as shown in Figure 66 with teacher in foreground) the booklet took over from the IWB, determining the quality of the student experience, and governing the attention and participation of students and teacher during the lesson.

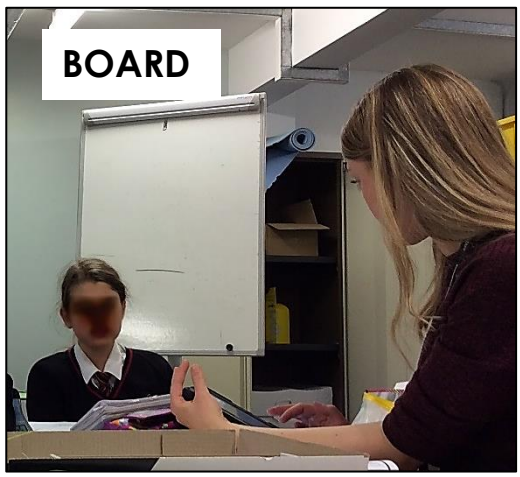


Figure 66 Alternative teacher zone, distant from whiteboard

In terms of physical participation in the classroom environment, the assessment regime exerted the most agency over the form of engagement which would be recognised and the progress which would be rewarded in the 'powerful and entrenched' (Latour, 2005) practices of School E. The *Minecraft* lesson booklet offered students the affordances to either engage

by filling the spaces provided for writing, or to enact their disengagement by failing to do so. Feedback on progress was not immediate since writing needed to be assessed by a teacher, although the booklet did provide students with 'pointers' called 'Success Criteria' which reminded students what should be included. Digital games, on the other hand, can provide immediate feedback on whether the repetitive activity or work of gaming is resulting in the skills or progress required to achieve the 'reward', promotion to a higher level or more peer status as a player. The reward for completion of writing activities in English Intervention lessons, rather than gaining peer status or access to new and interesting areas of learning, was often more repetitive work of a similar kind, at a similar level.

Repetitive activity is acknowledged to generate boredom (Macklem, 2015) whether this be as part of gameplay or classroom activity. Writing is the repetitive activity through which it is assumed students make progress in formal learning. It is seen both as an end in itself – that is to become skilled communicators – and as the performative enactment of understanding and learning in the form of compliance in terms of behaviour. Progress is also often represented through the amount and quality of the writing produced, in handwritten form, in this case, in the lesson booklet.

In gaming, similar repetitive activity is referred to as 'grinding' - undertaken to achieve a skill or access to the next level of the game. Players are known to become disengaged by this process, enacting their disengagement by 'cheating' in order to bypass such systems (Consalvo, 2009), or even leaving the game entirely, just as disengaged students will sometimes physically leave the classroom or refuse to attend school although there are significantly more restraints to this option in schooling networks, both socially and academically.

Each English Intervention booklet was identical in format, one homogenous region enabling the relationship between the teacher and the students to be a 'one-to-many' relationship, so that she could ensure the production of

writing from individual students. This was demonstrated through the teacher's constant verbal references (7) to writing during the first 10 minutes of the lesson. The clash between the material practices of the classroom and those of the virtual *Minecraft* world is shown in the quote below:

> Student: (to partner) Tyler, move out the door.
> Teacher: What else can you tell me about….
> Student: it's raining I'm going to shut the door.
>
> (Lesson observation audio recording, 14 March 2017, Appendix 13, ll.105-107)

Whilst students are focused on the materiality of the virtual environment (the rain) and affectively engaged in exploring the *Minecraft* environment, the teacher refers constantly to this 'grinding' aspect, that is the writing. Their avatars enacted engagement through their virtual presence (Sørensen, 2009) and the students through their communication about it, as shown in the quote above.

The teacher who was offline, in what Sørensen (2009) calls a one-to-a-half relationship, attempts to draw them back to the classroom practices by asking them questions about their actions. The emphasis on writing for assessment, and by implication, the artefact of the booklet, culminated in the comment:

> Teacher: Can I ask you, maybe, how many bullet points have we all done? Have we all managed to do about 6?
>
> (Lesson observation audio recording, 14 March 2017, Appendix 13, ll.83-84)

Ironically, despite the emphasis on quantity of writing, the physical space constraints of the booklet (Fig 64) did not enable sustained or lengthy written responses. Reflection points were indicated in the booklet after every

activity despite there having been little written activity to reflect on because of the time and space constraints (see Chapter 4 for detailed discussion of formal reflection activities). Disengagement emerged from the heavy emphasis on written responses and the very restricted time allowed in the *Minecraft* environment.

An alternative assemblage, which made *Minecraft* the main focus for the lesson series rather than treating it as a vehicle for the educational goal of writing structures, might have prevented the boredom I observed during the six-week period. By providing students with a narrative scenario (an apocalyptic event with a few survivors) to scaffold a series of building activities and avatar roles in *Minecraft* (see Fig 67) students could have developed individual and collective narratives. These narratives could have been both performative and representational – that is, they could have taken the form of traditional written stories, accounts and instructions, as required by the assessment regime, but also have been performed through the building and collaborative activities in the *Minecraft* environment itself.

In conclusion, the game of *Minecraft* had the potential to act as a 'boundary object' in the English Intervention lesson series, because even with the constraints of the lesson structure, the game itself continued to function and maintain its sense as a sandbox game despite the different needs of the teacher and students in the context of the classroom (Shields, 2013). However, its lack of sustained agency in the English classroom assemblage was highlighted by the dominance of writing as the key practice, rather than gameplay. As a result, the opportunity for *Minecraft* practices to intervene in or disrupt the stabilised practices of the English classroom in the way suggested in the previous paragraph, was lost.

Minecraft Intervention – Suggested Scheme of Work

SUGGESTED SAMPLE SCENARIO

There has been a serious epidemic which has killed off most of the population in the UK – a group of people escape a city and set up a new habitat in a remote area of countryside. The people in the group include:

A farmer
A librarian
A soldier
A community leader
A group of teenagers
A paramedic
A married couple with two small children

LESSON 1

Speaking and listening

3.1 Developing and adapting discussion skills and strategies in formal and informal contexts

- make clear and relevant contributions to group discussion
- help discussions succeed by acknowledging and responding to the contributions of others

3.2 Taking roles in group discussion

- contribute to discussions in different ways such as promoting, opposing, exploring and questioning

[Have Minecraft world projected on white board from iPad using Airserver software which is installed on classroom PC]

Explain the scenario and roles to the students – see above. Allocate roles to students.

CLASS or SMALL GROUP DISCUSSION (15-20 mins)

1. How do we choose a good site for the new village – what do we need in the environment to ensure safety and survival of the whole group?

   (Fly around the Minecraft world on board and look at different areas – snowy, desert, near rivers etc. If teacher unsure about this, have a confident student do it).

2. What initial buildings do we need to ensure the survival of the group? Bear in mind the different people in the group e.g farmer, family, teenagers etc. Each student to argue in their allocated role. Make a list.

3. What do the buildings need to be made of and why?
   (open inventory in Minecraft world, on board, and discuss the different building materials)

4. Mark the area where you have decided to build - a tower, a beacon with a sign labelling which building it will be. etc. Draw a class plan of how the houses should be laid out in the chosen spot – use a block, beacon to mark spaces for different buildings. Allocate buildings from the list to different people to build.

Figure 67 Alternative English Minecraft lesson scheme

5.1.2 Games as boundary objects - *FIFA*

The after-school Gaming Club took place on a couple of evenings a week, in two adjacent classrooms, one of which was used for the lunchtime *Minecraft* Club. It was organised by the *Minecraft* Club teacher, who brought a couple of PS4[42] consoles into school specifically for club use. The purpose of the club was purely social, with competitive game play akin to the esports gaming tournaments which are popular world-wide, such as *FIFA* eWorld Club. Staff and students were invited to participate in a knock-out tournament playing the *FIFA* game (EA Sports). Markovits and Green (2017) remark on the role of such sports games in creating a social narrative which affects people beyond the playing of the actual game. *FIFA*, like *Minecraft*, acts as a boundary object, linking home and school through the creation of an affective assemblage of game, technology (PS4 consoles) school context, students and teachers.

Each classroom was set up with a PS4 console at the front of the classroom, chairs for the two players facing a large screen. The other participants (50 people approx.) could sit or stand behind the players to watch the action and await their turn to play. A leader board was pinned to the wall and was updated by the organiser as each game was played. The game graphics and mechanics are very realistic (Fig 68) which adds to the feeling of continuity between it and the real-life world of football. Similarly to other sports video games, *FIFA* is often played in front of an audience, as it was on this occasion. The game enables two players to compete through their on-screen teams. The audience gives a heightened intensity of social relations between human actors with material elements such as the positioning of a large screen at the front of the classroom and chairs facing that screen contributing to this.

[42] PS4 – Sony PlayStation 4 games console, with game controllers, necessary for a full experience of FIFA game, where efficient movement is vital.

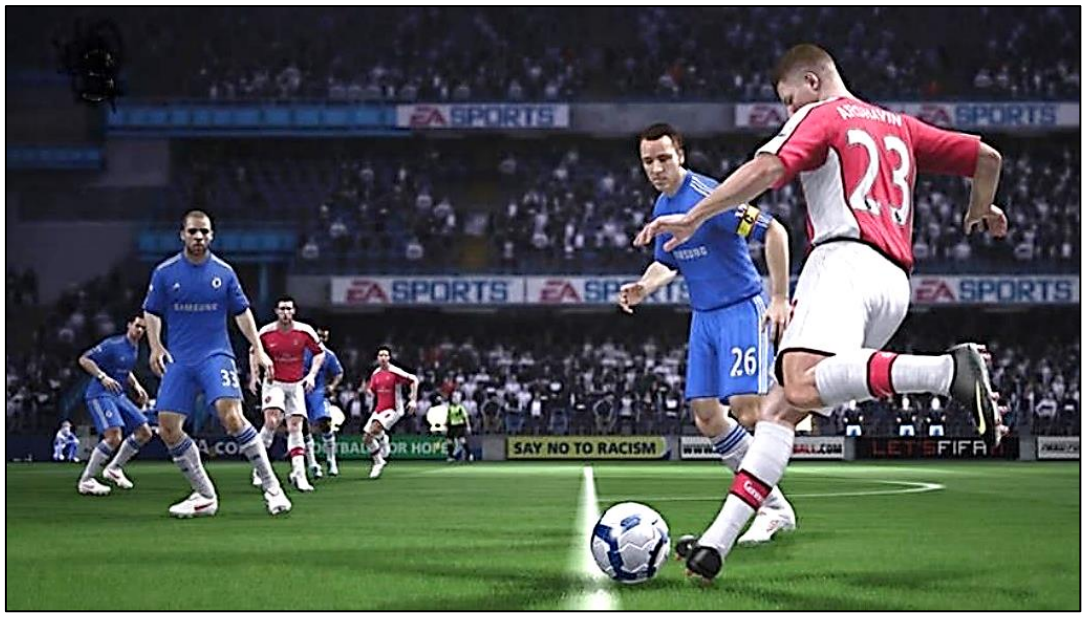


Figure 68 Screenshot from FIFA game

Sports video games, and *FIFA* in particular, provide players with a huge amount of information about real life players, clubs, managers, history and more. As a result, students are as likely to have extensive information about football and players as teachers and more likely to be expert players of the *FIFA* game. Unlike *Minecraft* in the English classroom, *FIFA* game play was not supplanted by schooling practices. Despite the classroom environment in which the gaming club took place, students' own knowledge, gained in out-of-school contexts, was valued and acknowledged. The *FIFA* game itself remained recognisable in the school gaming club context enabling students to maintain a sense of continuity and cohesion between their out-of-school social gaming practices and in-school extracurricular activities such as the gaming club. This enabled a re-configuration of relations between teachers, students, technology and game to emerge within the school network. By extending the network of school activity beyond the curriculum, there was more chance of students engaging in the whole school experience and avoiding boredom and disengagement.

5.2 Games as learning

5.2.1 Spatial practices and disengagement

In this section I move on to look at gaming not as an object or tool but as an end in itself, an embodied experience with a range of spatio-temporal constraints and affordances capable of producing both boredom and engagement.

Seating plans, which are a major part of the spatial and sociomaterial organisation of classrooms, should be irrelevant in the *Minecraft* environment where players can collaborate and explore any area of the world as they wish. Research in both games and classrooms associate boredom and lack of engagement with the inability to control the environment and movement within it (Bernstein, 2004; Davies, 2009). In this section I use data gathered from several events, in the form of pictures, observation notes and interviews to compare the spatial relations in classrooms with and without games and gaming in the home environment.

In these first two sub-sections I compare the game play experience of *Minecraft* in a formal English lesson with that of students in a lunch time *Minecraft* Club. Both events took place in the physical space of a classroom. Ironically, the spatial experience of the lunchtime club should have been more constrained than the English lesson because it took place in a Computer room with PCs set up in rows (see right hand image in Fig 69) making it difficult for students to physically socialise or collaborate, although they were able to do so in the virtual *Minecraft* world (LH image, Fig 69). In the formal English lesson *Minecraft* was experienced via an iPad, a mobile device which meant that students were not physically confined to one place in order to play the game.

Figure 69 English classroom (L)/Minecraft Club layout (R)

In practice, however, they did all remain around one table for the duration of the lesson, whereas *Minecraft* club members circulated freely around the club room.

5.2.1.1 *Minecraft* in English Intervention lessons

In section 3.3.4.3 I discussed in detail the rationale and process involved in setting up the six-week series of English lessons using *Minecraft*. Normally, when basing educational activities with a virtual world it would be desirable to set up a class *Minecraft* world. Due to technical and financial restraints this was not possible (section 3.3.4.1 p.88). Instead students worked in pairs allocated by the teacher and using the WLAN[43] to create a joint *Minecraft* world in which they could build and explore together. Even with these constraints, social and material entities such as iPads and *Minecraft* created a 'mesh of practices' (Burnett, 2013), where online and offline experiences were made available simultaneously. Whilst in the *Minecraft* world students were able to collaborate, communicate and help each other, in ways which are not encouraged in their classroom writing activities. In interviews two

[43] WLAN – Wireless Local Area Network. A wireless computer network that links two or more devices using wireless communication to form a local area network (LAN) within a limited area such as a home, school, computer laboratory, campus, or office building.

participants in the lesson, explained why such collaboration was engaging:

> RACHEL: Cos like you've got to sit in silence and…I like to talk like, talk to my partner like, when we're working
>
> ND: Mmm…do you find it easier to learn things if you can talk to other people about things?
>
> RACHEL: Yeah cos then you're like…think…know what they're thinking and you could like work it out yourself then you might get it.
>
> JOSH: …but when you're doing it in a group…you can like build on each other's ideas.
>
> (Rachel and Josh, English Intervention students, Interviews, July 2017, Appendix 11c)

The spatial relations created by *Minecraft* in this English lesson are an example of what Burnett calls 'classroom-ness'. *Minecraft*, as a technology, enabled students to exist and have agency in nested spaces – the *Minecraft* worlds created by pairs of students, as well as in the official space of the classroom. The teacher contributed to this hybrid assemblage by not creating a 'home' (Sørensen, p.166), in the form of her own desk or a space near the IWB as might have happened in a standard English lesson. Instead she sat at the table with the students or walked around the table speaking to individual students. She did not have an iPad and was not 'present' in the virtual *Minecraft* environment alongside the students, participating as an observer. In the physical classroom the usual one-to-many relationship by which teachers assume authority was subverted by the teacher taking the role of learner and potential audience for the written instructions the students were supposed to be creating in their booklets. She enacted this role and form of participation by verbally requesting students to explain elements of the game interface:

> Right that's the kind of thing I probably need to know next so that might be another instruction. Now what does this inventory do? Like I don't know, I don't know what an inventory is, I don't know what it does
>
> (SH, English teacher, March 2017, Appendix 13, l.16-17)

For a short period in this lesson, before teacher authority was re-asserted through the mechanism of the lesson booklet, students were affectively engaged by their sense of agency and immersion in the gaming environment where they were creating and sharing knowledge with peers and with teacher. Because *Minecraft* is a sandbox game the practices which develop during a gameplay experiences can be shaped by participants with different goals and create a range of affective experiences. It is also the reason why the *Minecraft* game is so popular in schools. If teachers are familiar with the affordances and constraints of *Minecraft* it is possible to scaffold game play to accommodate educational goals without compromising the affective engagement of students. The expected gaming practices in *Minecraft* are those of exploration and building which necessarily involve spatial movement and orientation. The affordances provided by the game, the ability to move around the world unrestricted and build where and what they like, gives the students a sense of agency. Repetitive activity is within the player's control; hence boredom is less likely to emerge.

In the next section I compare the classroom experience of *Minecraft* with that of School E's *Minecraft* club and then with two commercial games. The first game is *FIFA*, a popular, multiplayer football game played in an after-school gaming club has already been discussed in section 5.1.2 and the second, a puzzle game called *The Turing Test* which was played by Dylan, one of my participants, in his home environment. The data from *Minecraft* Club was collected over several months, through informal chats and interviews with students and a teacher, (Appendix 11a), photographs of participants in the *Minecraft* Club classroom, audio and video-recordings

and screenshots (see Chapter 3, Table 3 & Fig 8) and through field notes and observation of one after school session, in the case of Gaming Club. Dylan and Robert, whose gameplay sessions are discussed in the following sections, were founder members of the lunchtime *Minecraft* Club.

5.2.1.2 *Minecraft* Club

> The *Minecraft* club is not really a club but a classroom with children apparently playing *Minecraft* over lunch.
>
> (Field note 24th March. 2017)

The network assemblage of *Minecraft* Club consisted of the physical location, the technology, the participants and the virtual environment of *Minecraft*. The club took place in a Computing classroom (Fig 70) and was supervised by a teacher during lunchtime break at School E. The physical layout of the room was constrained by fixed work benches with computers organised in rows, with chairs facing individual screens rather than fellow students. The furniture in the room precluded changing the layout for the lunchtime club. There were between 15 – 20 players in the room on any one occasion. Students had no clear line of sight to other students (Fig 70 top row of images). Despite this, groups of students often clustered around one computer screen watching and discussing each other's gameplay. There was also the opportunity to communicate with others using the in-game chat facility, in contrast to *Minecraft* play in English lessons where students communicated verbally. In contrast to the constraints on movement in the English classroom, movement in *Minecraft* club was more reminiscent of the game-based learning lesson (section 5.3.2) or of the home gaming context. People drifted in and out of the club room during the lunch hour – the only constraint to entry was that students had to be playing *Minecraft*.

Figure 70 Minecraft Club room layout

The room layout and constraints on language and activity such as eating lunch enacted the official space of a classroom. Unofficial spaces were also created through the interactions around screens, invading screens and on-screen activity (Burnett (2013). These unofficial spaces were enacted through student movement in *Minecraft* and in the club room, their focus on each other's screens and their informal language in discussion.

Within the virtual *Minecraft* environment sociomaterial relations were enacted in different configurations of the *Minecraft*Edu server, which can be altered to present different versions of the virtual environment. Three students were nominated to run the *Minecraft*Edu server which was physically located on a PC within the club room. Virtual activity was constantly re-structured each week by the material state of the server, which was partially subject to the moderators' interventions. The moderators, Stuart, Mark and Dylan, had wider powers than other club members, for example having the ability to turn Player versus Player (PvP) fighting on or off; the use of TNT, change the day/night cycle, decide whether text chat is allowed, block access to the world and resources temporarily. However, the moderators also helped other students with any technical problems.

In Figure 71 examples of some of the in-world activities in the *Minecraft* Club world were captured by taking pictures of screens over students' shoulders. The unofficial space created by *Minecraft* activity and practices enabled students to take part in affinity groups and enter into apprenticeship relationships with *Minecraft* experts such as the student moderators. Subcultures or affinity groups developed around two or three different activities - PvP and competitive building. These affinity groups manifested themselves both physically, with the people around them in the room and on-screen. When the on-screen play was PvP, students re-enacted screen action physically, in the classroom space and urged each other on, similarly to behaviour observed at a *FIFA* game session in the after-school club which is described in the next section.

Students gathered around the screens where virtual fights or competitive activities were being enacted through player avatars. Watching others play games is a popular form of entertainment, as well as a way of learning more successful game play practices, on platforms such as Twitch, Steam[44] and YouTube. The collectivity of the viewing experience enables players to improve their own gameplay skills. Many students explicitly use YouTube to learn building techniques in *Minecraft* and post their own content as well, as was confirmed in interviews with participants:

> ND: So what sort of things, when you watch YouTube yourself, what sort of things do you watch?
>
> Dylan: I watch these people called FunkBros (right) and they, they're really nice
>
> ND: So are they just showing you things..or are they teaching you how to do things or…
>
> DP: They just...mess around but like as you can see like *Minecraft* modded TNT was, that's for like PC and all that ...
>
> (Interview, Dylan, *Minecraft* Club)

Virtual activity in Minecraft was configured by the particular group of students who turned up in any particular week - no scaffolding was provided by an adult and it could be argued that the network was held together partly by the student moderators, by shared interest in Minecraft and by the need to find an engaging lunchtime activity. Dylan attempted to take

[44] Online video sharing platforms.
Steam is a video game digital distribution service by Valve, also provides community features such as friends lists and groups, cloud storage, and in-game voice and chat functionality. https://store.steampowered.com/
Twitch is a video live streaming service operated by Twitch Interactive, primarily focuses on video game live streaming, including broadcasts of esports competitions, in addition to music broadcasts, creative content. www.twitch.tv/

Figure 71 Minecraft Club screens - examples of Minecraft activity

control of the agenda in November 2017, 8 months after the club had been set up – he asked club members whether anyone was interested in setting up a series of mini games within the MinecraftEdu environment. This would have focussed members' activity on coding, the reason behind the original creation of Minecraft Club. It would also have created more of an agenda, albeit student-led, in the absence of teacher scaffolding or a stated aim for club activity.

Not all games affect players in the same way as *Minecraft*, however. With that in mind, I collected data on a variety of commercial games played at home by two of my participants – *Rainbow Six Siege*, a first-person shooter and *The Turing Test*, a first-person puzzle game, to enable me to compare participation practices. Ash & Gallacher (2011) draw on the research of Juul (2002) who identified two types of game structure - progression and emergence - which produce different kinds of affective engagement in the player. In a progression structure the game designer controls the sequence of challenges and events that a player experiences, with pre-determined actions are necessary in order to make progress in the game. *The Turing Test*, played by Dylan and described in the next section, is a good example of this structure. Emergence structures have small numbers of rules with a wide range of game situations and events. *Rainbow Six Siege*, played by Robert (section 5.2.2.1), had both emergence and progression structures within it. These structures affect the nature of the game play experience, the affordances and constraints which contribute to the performance of engagement.

The data for the games my participants played at home was collected through audio recordings (transcripts in Appendix 11b) and screenshots (Section 3.3.4.4. Fig 13) used to reconstruct gameplay from the participant audio commentaries. I asked my participants to 'narrate' their game play for me on a voice recorder – to explain their movements and what they were seeing, as far as possible. I have referred to this in Chapter 3, a

technique called 'interview to the double' (Nicolini, 2009, p.196). Robert produced two 50-minute recordings of game play in *Rainbow Six Siege*, Dylan, only 10 mins in *The Turing Test*. I also asked my participants for pictures of their home gaming spaces but was only able to obtain this from Dylan. Dylan had never played *The Turing Test* game before so was exploring and learning as he progressed through the game. Robert was clearly a frequent player of *Rainbow Six Siege*, a first person, multiplayer game and he was online in both recordings, with a friend whom he played with often.

5.2.1.3 Dylan – *The Turing Test*

The data drawn on in this section was a 24-minute commentary, audio recorded by Dylan at home and two interviews conducted in School E, one with Dylan himself and one with Dylan's key worker in school. As already mentioned, I had asked participants to choose a game they were not familiar with. The commentary was recorded in Dylan's bedroom where he has most of his gaming equipment – an Xbox and a WiiU. He also has an PS4 which is located in the living room as he shares this equipment with his brother.

The home environment and gaming set-up formed a significant part in Dylan's game play experience. He has been identified as ASD and is also dyslexic. According to his key worker, he struggles with group work in school. Dylan himself mentioned that he finds it difficult to focus on either games or lessons if an environment is noisy or there are lots of people around. In a conversation with me at *Minecraft* Club about the difference between playing *Minecraft* at home and in school, at *Minecraft* club, he said he enjoyed it more at home:

> …Yeah, because- cos I can just let my mind go loose but like in here, I have like- [1] I have people around me so I

> can't- cos I have people talking people shouting I can't get focused.
>
> [Dylan, Interview in *Minecraft* Club, May 2017)

Dylan chose a single player game, *The Turing Test* (Fig 72), when I asked him to make an audio recording of his game play at home. Dylan and his key worker confirmed that he also enjoys the social side of gaming with others, usually using the multiplayer *Minecraft* at home with friends. His key worker told me that Dylan enjoyed the social side of being involved in school music productions.

Figure 72 Screenshot from 'The Turing Test'

The Turing Test Game, which is produced by Microsoft, is described thus:

> The gameplay of *The Turing Test* consists exclusively of solving puzzle rooms using the Energy Manipulation Tool (EMT) - a gun that transfers energy to and from different conduits. These conduits open doors, move platforms, provide power to giant magnets and so on. While the EMT is the primary tool, as the game progresses other objects can be used in the environment to aid in tasks such as cameras and little robots that can also transfer energy.
>
> (*The Turing Test* Review, Gamespew, 2016)

Reviews of this particular game rated it as 'hard', with the skills level required rising rapidly. If the level of challenge is too high in a game there can be the potential for a negative, affective experience. Dylan does not play many games of this genre and has particular problems with differentiating colours, which may be a problem with some gameplay, as discussed later. The progression structure of this game could also be perceived as 'grinding', as referred to in section 5.1.1.1, where a repetitive activity has to be performed to move onto the next section of the game which can become disengaging for the player.

I was able to reconstruct Dylan's journey through the game by listening to his audio recording whilst I played the game myself. As I played, I took screenshots based on details from his commentary (Fig 12, Section 3.3.4.4). Dylan addressed me directly in the recording and both narrated his own actions and explained things to me, assuming I could not see the game myself.

His first comment was that he was on the 'learner screen'. A game tutorial at the beginning of digital games is common. It allows the player to become familiar with the game environment and controls in a short section of simulated game play before beginning play for real. In some senses, this tutorial was similar to teacher demonstrations in Science classrooms (section 4.2.3) where students watch an experiment before they perform it themselves – the key difference is that students in the Science lesson could only watch, not physically rehearse the actions they would eventually need to take.

The 3D game environment of '*The Turing Test*' 'mobilises the users' bodily modes of attention, orientation and spatial navigation' (Ash, 2009, p.2113). Dylan had a first-person perspective - he was looking through the eyes of his on-screen avatar

> I'm walking right now...right...get me here a...hey, I'm looking at a computer…
>
> (Dylan, Gameplay commentary, March 2018)

His sense of embodiment and affective engagement within the game was mirrored in his reactions – when he came to a large drop down a shaft, he reacted with alarm, as if he were really in danger of falling. When he arrived at a door and had to wait for over a minute for a new section of gameplay to be unlocked, there was real potential for disengagement to occur. However, his curiosity and prior knowledge of gaming practices and functionality enabled him to predict future activity which, in turn, helped to maintain his affective engagement,

> …it's gonna be a puzzle [4] so yay.

When he eventually gained access to the next section of game-play he was confronted with a series of sectors with obstacles or mini puzzles which had to be solved before he could progress. For example, the first room he reached had a closed door with a container in it – the player had to figure out how to pick it up and carry it to the entrance of the next door which needed to be accessed to make progress. This progression structure was echoed in the game-based Computing lesson I discuss in section 5.3.2. Again, there was the potential here for a negative experience, for disengagement to emerge as no instructions were given. However, the voice over supplied by the AI (Artificial Intelligence) character in the game continued to provide commentary on where Dylan was and what he was seeing. This section of the game relied on what Linderoth (2012) calls 'attunement' where players progress by perceiving affordances offered by objects in the game. Successful players are those who 'attune' to the game environment more quickly and are able to take necessary actions. Ash (2009) also comments on this use of colour and light from the screen which demarcates how to engage with the image and provides sensory confirmation of players' actions. Dylan's ASD and dyslexia meant that he

> … (1) struggles with green uh whites, you know anything that isn't colour.
>
> (Sylvie, Dylan's key worker, Interview, April 2017, Appendix 11 ll.16-17)

which may have contributed to his difficulty in recognising the affordances of these particular puzzles. At 20 minutes into the game, Dylan ceased to progress in the game – there was a four-minute silence on the recording after which he admitted that he was struggling to solve the puzzles. Progression is part of engagement in game play, as already discussed.

> One of the dominant experiential effects of videogames as a medium is the sense of agency induced by the player taking meaningful action, action that influences future events in the game.
>
> (Zagal & Mateas, 2015 p.1)

By failing to solve the puzzles, Dylan was unable to take meaningful action to influence events in the game. The affordances provided in the puzzles constrained action and his level of affective engagement. He was 'trapped' in a virtual room in the game with few options for the movement impetus (Davies, 2009) necessary for continuing engagement. The options available to him were to replay previous sections of the game or cease play. Dylan gave up playing, physically disengaging by exiting the game.

Dylan admitted that he also found it difficult to focus on formal learning,

> I do get side-tracked in learning because… I have problems…It's just that there's more stuff to get me distracted…

but that his normal gaming practice was to play two games simultaneously,

> … I can spend as much time as I like on a game and then I can move on to a different game if …I'm getting bored of one.
>
> (Dylan, interview in *Minecraft* Club, May 2017)

His strategy for avoiding the affective experience of boredom, one in which he felt he was making no progress, was to switch to another activity. In *The Turing Game* his inability to progress through the puzzles was at best boring and at worst, deeply frustrating. The ability to manipulate his physical and virtual environment, both spatially and temporally within the home gaming context, had the potential to provide the means for affective engagement to be maintained. Dylan did have the means to continue trying the puzzles, to look for 'cheats', or to ask others for help but chose not to do so, probably because *The Turing Test* was a new game to which he was not particularly attracted.

However, the social motivation to continue, usually provided by peers, was not available as part of the single player experience. Robert, another participant in my research who played a multiplayer, online game, *Rainbow Six Siege*, did receive encouragement from peers when he played. For example, he was motivated to overcome a 'lagging[45] glitch' because of the effect it was having on the social group he was playing with. He also used YouTube and the Internet as a source of information to overcome frustration.

Another difference between Dylan's home gaming experience and similar classroom experience is that his agency extended to the entire gameplay assemblage. During gameplay, the game itself exercised agency over his actions in the sense of restricting activity and progression. However, unlike the classroom, Dylan could choose to disengage from all gameplay activities by turning off his computer or clicking to exit the game. However, in a classroom he would have had the benefit of teacher support and

[45] Lagging - in online **gaming**, **lag** is a noticeable delay (latency) between the action of players (input) and the reaction of the server supporting the **game**. It is experienced through the player's avatar moving very slowly or not at all.

scaffolding to help him when puzzles were too challenging. *The Turing Test* game required the player to exercise a high degree of independent decision-making, patience and to have the ability to discern visual clues on the screen, qualities which Dylan lacked.

5.2.2 Temporal framings and disengagement

As has been discussed in Chapter 4, in schools the timetable determines the participation of students and teachers in a specific physical space, at a specific time of day. Sociomaterial practices are related to these specified locations and timings, governed in part by the curriculum subject (p.179).

Year 7 English Intervention lessons, by virtue of their intervention in students' normal learning practices, were disruptive, even in the absence of the *Minecraft* game. This changed the nature of affective engagement in them. Students were physically removed from other subject lessons which they enjoyed, such as P.E, to attend English intervention in non-specialist classrooms, not necessarily with a full-time English teacher. Their agency in this situation was even more constrained than usual. Some students seemed unclear about why they were part of these intervention lessons and regarded them as a 'punishment'

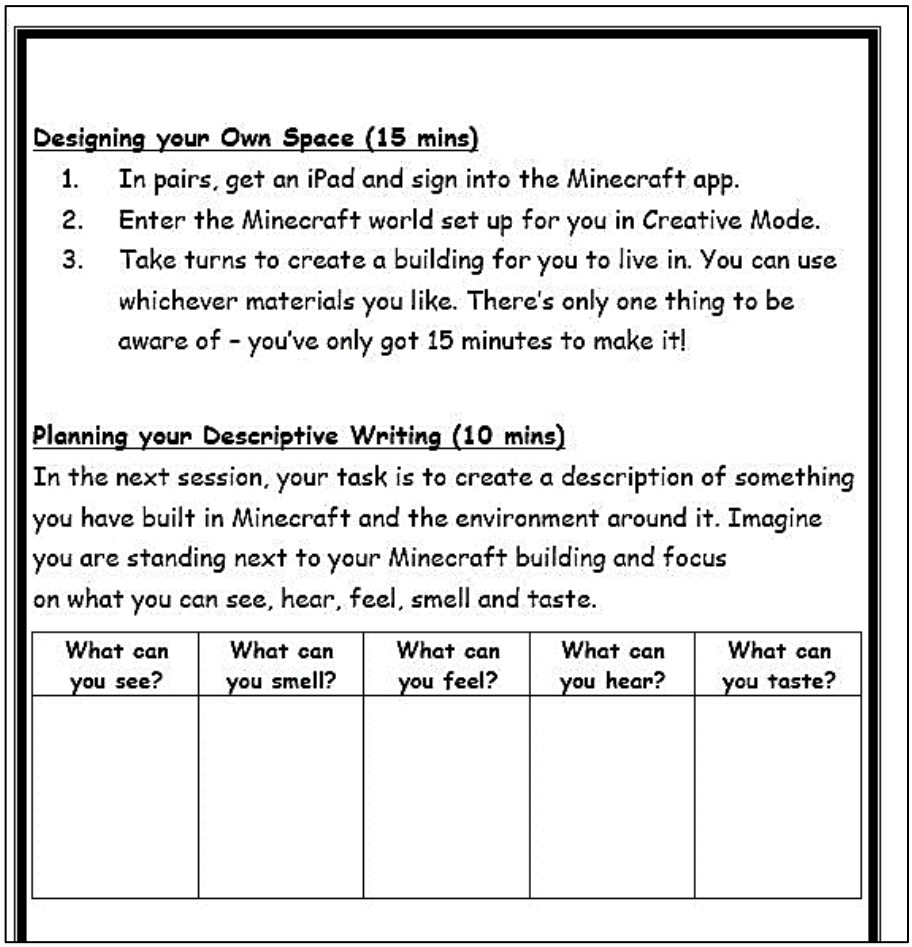
> English Intervention was… (puzzled face) …what have I done wrong? You could tell what I'd done in Maths cos like it was stuff that like generally people had done wrong and then English I'm like, but I already know this…
>
> (Charlie, Year 7 English Intervention student, Interview, June 2017, Appendix 11c, l.546-549)

It could be argued that the affective intensities in these lessons were already pre-disposed to produce boredom and disengagement. *Minecraft* gaming

practices which may have had potential to alleviate these affects, were themselves constrained both spatially and temporally during the English Intervention lessons. From the six hours or 360 minutes allocated to this lesson series, only 30 minutes (8%) were allocated to activity within the *Minecraft* virtual environment itself. This time was split into two activities within the virtual world, each of which was allocated 15 minutes, with outcomes being prescribed by the printed instructions and space allocated within the lesson booklet. The argument for these constraints may have an attempt to inject 'pace' into the lesson by adding a sense of urgency. However, it is more likely that the necessity to achieve a number of academic outcomes exercised more agency in this assemblage.

Time in *Minecraft* gaming outside of the classroom is not subject to such constraints. Building is an activity which can be returned to again and again, it is an end in itself not a means to an end such as Planning your Descriptive Writing (Fig 73), for which the aim was to generate a description of their *Minecraft* constructions and surrounding areas.

In the routine English lessons at School E, time is regulated in standardised ways. Normal practice in Years 7-9 was for students to start each lesson with 10 mins silent reading from a book of their choice. Many students appeared to enjoy the sense of personal time and space which was created by this activity – it was mentioned positively by several of the students I interviewed. It was also a contrast to other subjects where starter activities were common and usually required instant action, on arriving in a classroom. The reading activity was followed by introduction of a task and then silent, individual writing tasks.



Designing your Own Space (15 mins)

1. In pairs, get an iPad and sign into the Minecraft app.
2. Enter the Minecraft world set up for you in Creative Mode.
3. Take turns to create a building for you to live in. You can use whichever materials you like. There's only one thing to be aware of – you've only got 15 minutes to make it!

Planning your Descriptive Writing (10 mins)

In the next session, your task is to create a description of something you have built in Minecraft and the environment around it. Imagine you are standing next to your Minecraft building and focus on what you can see, hear, feel, smell and taste.

What can you see?	What can you smell?	What can you feel?	What can you hear?	What can you taste?

Figure 73 Lesson booklet, Activity 2 description

Leander (2007 p.27) has argued that space-time in schools involves sequential activity with a single space for each task. The lesson booklet was the agent for this sequential activity, organising tasks into a linear order with restraints in terms of time and space, as indicated by the bullet points left for students to complete in the booklet (Fig 74). The booklet imposed a limited range of affordances for students and a constrained form of participation for the *Minecraft* game. There were limited ways to perform presence in the classroom in particular, something which is discussed in more detail later in this chapter.

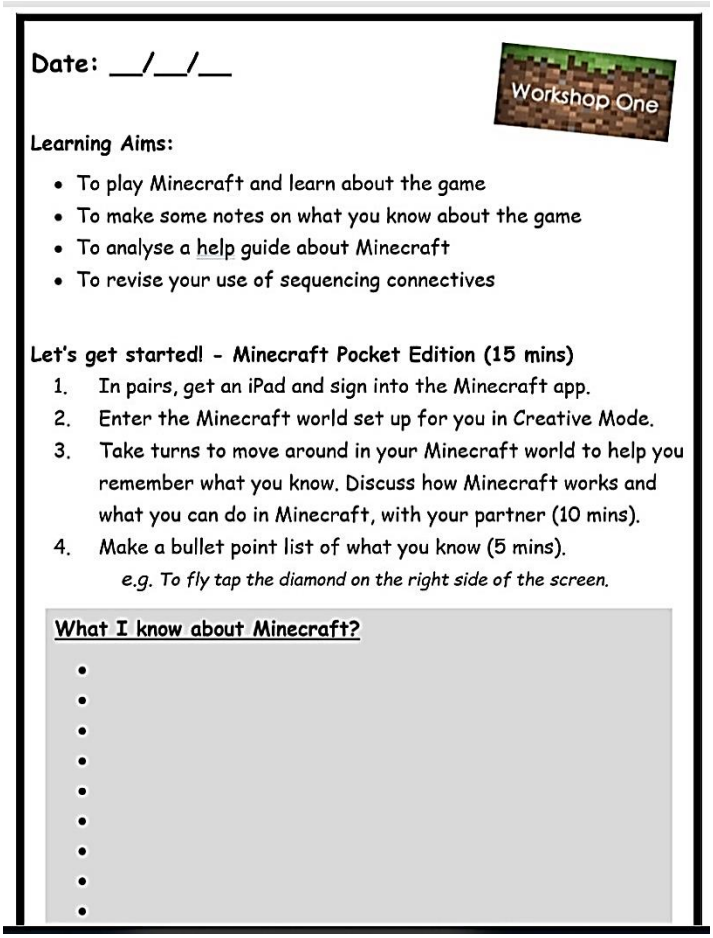


Figure 74 Sequential tasks in Minecraft lesson booklet

Simultaneous activity is usually the norm in online spaces such as *Minecraft*, practices happen across multiple spaces and texts. As a result, online practices often do not 'fit' within traditional classroom practices, becoming potentially 'disruptive' (Hembre, 2019 p.3). Normal gaming practices in the *Minecraft* environment would be disruptive to the habitual spatio-temporal practices in English lessons. Both the teacher and the presence of the lesson booklet ensured that this did not happen.

Unfortunately, the re-imposition of linear and sequential time frames resulted in boredom and disengagement with lesson activities emerging. In the next section I discuss a gaming event in a commercial game, *Rainbow Six Siege*, where disengagement emerged as a result of temporal agency over the gaming assemblage.

5.2.2.1 Robert – *Rainbow Six Siege*

One of the ways in which temporality in videogames is expressed materially is in terms of the frame rate or the rate at which the visual interface of the videogame refreshes itself. According to Ash (2009) this produces 'the physiological experience of spatial and temporal movement' (p2113). The temporal dynamic produces a relation between 'lived duration' of the player and the digital image on the screen which emphasises movement. The typical characteristics of frame rate or time in digital games are that they will echo 'real time' or that of the player and their physical actions via the game controls. Slow frame rates, or 'lag', materially affect the player avatar's visual movements on the screen, occasionally slowing down to the point where meaningful actions on the part of the player are not possible. In the game session which Robert recorded for me, another player deliberately induced a glitch which led the game to 'lag'. Shoenau-Fog (2011) identifies this as interfacing activity, participation in terms of control of the game and physical action. The inability to take physical actions caused by 'lagging' affects immersion or absorption leading to frustration and potential disengagement from the game.

> What's happened to the frame rate? What's happened here? I can't even walk in a straight line because of this…we're about to lose team mate because we can't pick him up, we're lagging like mad because of them, this is how cheaters win the game [1] this is when it gets annoying..
>
> (Robert's game commentary, 2017)

The materiality of the relationship between Robert and the game was expressed in his use of the first person 'I can't even walk in a straight line…' when describing the actions of his game avatar – Sørensen (2009) would call this 'virtual presence'. Leonardi (2010, n.p) says that what gives digital artefacts such as digital games their material properties are the capabilities

they provide, which afford or constrain the action. The affordances of such a first-person shooter game are to allow the player avatar to move in real time at the same speed as the player is operating the controls, or as Ash (2009) puts it 'spatial movement is based upon the temporal immediacy of events as they occur, and on reaction to affective, sensory, stimulus'. Visual materiality is enacted by the student's direct control of their avatar with no separation between digital avatar and human player (p.21). In normal circumstances Robert is able to manipulate what is seen and how it is seen as he progresses through the game. However, when the game 'glitch' or 'lag' constrained the avatar's virtual movements and created a perception of lack of agency, it distanced Robert from game activity temporarily, affecting his virtual presence and resulting in disengagement.

In classrooms, students like Robert, who are accustomed to the 'qualitative and excessive movement' (Ash 2009, p.2115) which is promoted by real-time

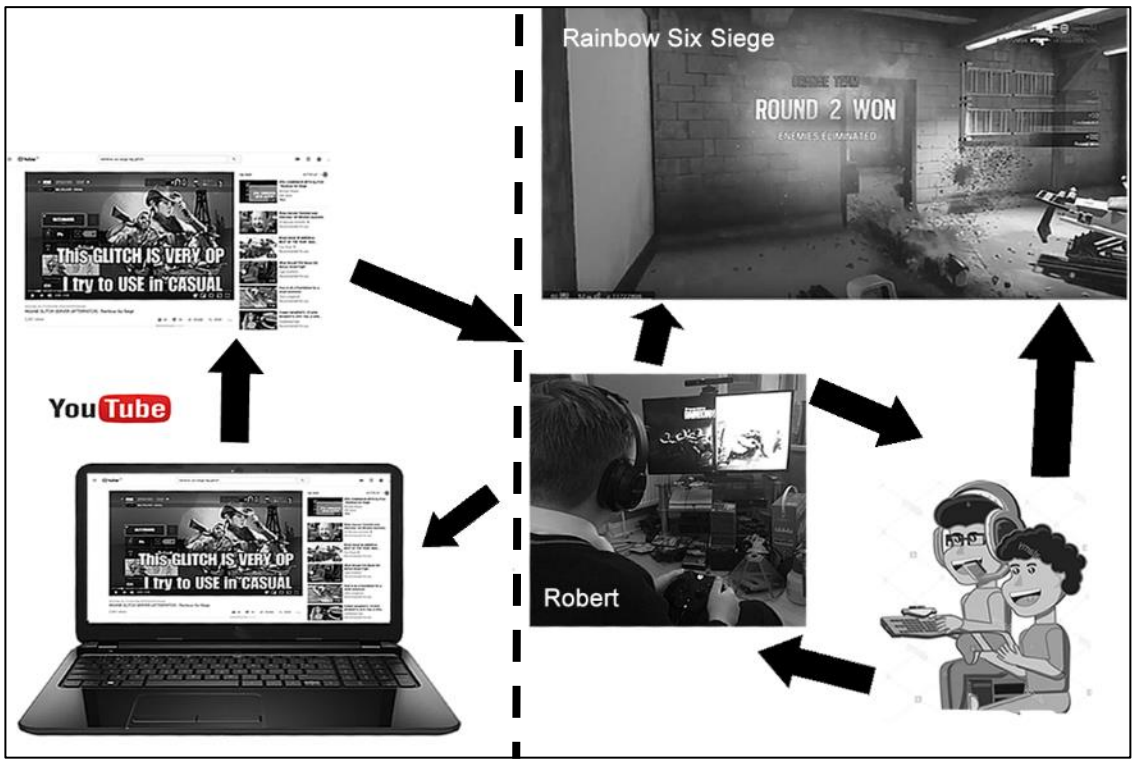


Figure 75 Robert's Rainbow Six Siege game network

image refresh in video games, may experience time duration in learning activities as 'lag'. Relations between material objects, teachers and students do not afford individual human subjects with the capabilities to take actions beyond those prescribed by the teacher, actions which might allow them to re-engage in the activity. This was discussed in detail in section 2.2.3.2 and again in the section 4.3.2.1 on 'pace'.

In contrast to classrooms, the visual interface of the game *Rainbow Six Siege* allowed Robert to identify that other players had caused the 'lagging' glitch which opened the possibility of searching for a way to regain control of movement in the game space. He was cognitively and affectively engaged through the participation of YouTube or a similar video platform (only audio evidence available) which provided Robert with information which gave agency over the material practices of the game, direct control, not just over his own avatar, but the whole interface, the virtual environment. Indeed Ash (2009) comments that players' behaviour comes to be controlled by the 'continued production of affective experience' (p.2120).

Unlike the relations between teacher-digital timer-IWB which created regional space for teacher and students, Robert's intervention was only temporarily authoritative with the game space which was fluid enough to allow this. The specific *Rainbow Six Siege* game space in which Robert was playing intersected with network gaming space (illustrated in Fig 75 showing relations between off-line and online activity) which allowed the assimilation of potentially hostile external forces such as the glitch within the bigger gaming affinity group. The fluid space of this specific *Rainbow Six Siege* session gave Robert the opportunity to perform engagement in an alternative form to normal game practices.

In the next section I explore how such alternative ways to perform engagement might be designed or given space within a classroom environment.

5.3 Gaming with learning

5.3.1 Re-structuring social relations through gaming

As Duncan (2016) suggests, the 'games with learning' framing encompasses a more complex interrelation between the way games are designed and learning practices. Across the different situations in which gaming was explored in School E, sociomaterial practices emerged which gave further insight into the production of boredom and disengagement. The games played and the physical environment in which they were played were less important than the relations the game itself engendered between actors, both human and non-human. Repetitive activities, lack of variety in terms of timing and pace, barriers to freedom of movement or action or the ability to access information independently, lack of challenge and support were all elements which emerged from the assembling of different actors in different situations in both gaming and classroom environments.

Games can provide the material means to create a social space which regulates space and time variably and where students and adults can relate as equals, in the absence of power relations engendered by the assessment regime in formal learning. In the next section I look specifically at how relations between human actors can be altered by the assembling of elements in gaming situations. I conclude this section by looking in detail at an engineered application of gaming design – a gamified or game-based Computer lesson, exploring how elements such as freedom of movement, progress, collaboration, access to information created an affective atmosphere for students.

Three specific situations give an insight into how adult-child relations can be changed by different sociomaterial practices when gaming is part of the

schooling assemblage. The first has been explored in other sections – an English Intervention lesson, the second an after-school gaming club and finally the lunchtime *Minecraft* Club, which will be discussed now.

In the lunchtime *Minecraft* Club direct teacher supervision was minimal and confined to the classroom space, with the teacher taking no part in the *Minecraft* virtual environment. As the only other adult in the club room, I occasionally took part in *Minecraft* gameplay during which my role was much more akin to that of an experienced peer. I established this role through various means such as: introducing myself by first name only, dressing casually, bringing my own laptop, being an active *Minecraft* player and showing my own content and being able to use the appropriate terminology of servers, mods and gameplay modes. I asked students for *Minecraft* advice and acknowledged their expertise in this area (Appendix 11a). As the months went by students would greet me by name and call me over to look at what they were doing in the *Minecraft* virtual environment. Levels of affective engagement in this environment were generated by the relations between game, students and me as a fellow player rather than a teacher imposing structure on gaming club practices. Students were bored in *Minecraft* Club as well as engaged but affect was generated moment by moment, by elements within the gaming assemblage and the affordances and constraints available. Examples of this included material considerations such as the number of computers available, the state of the *Minecraft*EDU server, the agenda for on-screen play and so on.

The after-school gaming club had quite different dynamics to the lunch-time *Minecraft* Club. The participants were exclusively male, with staff and students theoretically of equal status in this social situation. However, adults were 'not automatically resident experts by virtue of their age (Ito et al., 2008, p.2). In a discussion with the club organiser, he agreed that the purpose of the club was less about gaming and more about cultivating less hierarchical relations between staff and students via the *FIFA* videogame. According to Markovitz and Green (2017), there is a strong social pressure on

students to play games which their friends and/or elders play and the culture surrounding *FIFA* is an important way to establish and maintain relationships in a community or affinity group. The affective relationship created through the positive identification with players and teams in real life has been identified as a major factor in the success of the *FIFA* game (Markovitz and Green, 2017). The interactive, simulation-based game play 'expands the boundaries of participation'. Gamers have more exposure to information about football which makes them more affectively involved in the game. Students were as likely to have extensive information about football and players as teachers and more likely to be expert players of the *FIFA* game,

The choice of a football game for the club increased the likelihood of the participants being male and of the presence of a competitive atmosphere. When I discussed the composition of attendees at the gaming club the organiser acknowledged that it might exclude female students and staff members. There were plans for later sessions to include *Rocket League*, a driving game which, according to a survey I conducted, was played by both male and female students. In terms of engagement with the school community, much of the value of both the after-school gaming club and the lunchtime *Minecraft* Club laid in their ability to re-configure the relations between school and home and between knowledge gained from formal learning and gaming expertise. By extending the network of school activity, beyond the curriculum, there was more chance of students engaging in the whole school experience avoiding boredom and disengagement.

In the concluding section of this chapter I discuss one lesson which had been explicitly designed to include game-like elements, in terms of space and time, but also in the design of material artefacts within the lesson assemblage.

5.3.2 Designing an engaging learning experience: Cryptography

Gee (2003) argued that games should be seen as drivers of educational change and models of situated learning for new instructional environments. The Computing lesson I discuss in this section is offered as an example of such a potential model of situated learning.

Cryptography is the art of writing or solving codes. In the context of the English Computing curriculum students are required to understand the nature of encryption as part of computer system security. Puzzles and codes are at the heart of many videogames and an intrinsic part of engaging players. By choosing this topic in particular, around which to develop a 'game-based lesson' (teacher's words) there was less temptation to add a gamified 'gloss' to a traditional lesson by adding superficial aspects of games such as points and badges. Indeed, as I will describe, the context, resources and scaffolds in this lesson had been designed to allow students to experience the topic they were learning in a meaningful way.

I was invited to this lesson by the teacher who supervised the *Minecraft* Club. For this analysis, I drew on lesson observation field notes taken during the lesson; elicited feedback from the students in the form of an online lesson evaluation and the OneNote Class Notebook which formed the material interface of the Cryptography 'game' or learning experience.

The key elements which were used to 'gamify' this lesson relate to pacing and time, movement and use of technology, all aspects discussed earlier in this chapter. In this lesson the technology was Microsoft OneNote, a digital notebook which allows users to gather notes, drawings, video and audio making them accessible on the Internet and/or over a computer network. OneNote Class Notebook is a variation of OneNote which enables teachers to set up a class notebook with individual student notebooks contained within it, alongside a Content Library which teachers can add content that is

not editable by students and a collaboration space which is editable by both students and teachers.

The Computing Department in School E used the Class Notebook widely for most of their classes as a kind of textbook/student portfolio. It enabled them to set up interactive content for students which they could work their way through individually but which the teacher could see at any time. New content could be added for students and groupwork could be done in the Collaboration area. For this lesson, the teacher had used the Content area where he had set up a shared scenario called Escape Room (Fig 76). The scenario involved a bomb in a nuclear plant and students had a specific amount of time to solve the clues and stop the bomb. In terms of learning, this activity introduced students to concepts such as encryption and decryption through the experience of solving the codes in the online puzzle.

In the observed lesson students opened up their individual OneNote Notebook in the Class Notebook in what appeared to be a well-established practice, since all students performed these actions without direction as soon as they were seated at a computer. Other visible pedagogical practices such as the taking of the register and the providing of a starter activity on the IWB (unrelated to the main lesson activity) took place in the first few minutes of the lesson, establishing the teacher's explicit authority in the classroom. Interestingly, students also accepted my presence without question, perhaps due to the current 'surveillance culture' of English secondary schools (Page, 2017) where many lessons are observed, although later student actions would suggest otherwise (see this section, p.255).

The teacher explained the Escape Room scenario, using competition between individual students as a motivating element in the initial activity, to solve the Morse code puzzle (Fig 76). At first glance the introduction of competition between students might be seen as a game design element, but in fact is habitually used as a marker of visible pedagogy where success is measured against other individuals. The teacher actively discouraged

collaboration or physical movement around the room at this point, which reinforced not only visible pedagogy but his explicit control.

According to the teacher (in chat with researcher) the goal was not necessarily to reach the end and escape the room – the process itself was the learning goal. It was supposed to engage students in learning about different types of cryptography through practical experience. The structure of the OneNote Notebook text (Fig 76) bore distinct similarities to what Ash (quoting Juul 2002) calls a 'progression structure' where game designers control the sequence of 'predetermined challenges and events'(p323).

There were distinct similarities between students' experiences in this lesson and Robert's experience of playing the multiplayer mode in *Rainbow Six Siege*. *Rainbow Six Siege* is a tactical shooter game where recruits are being trained to undertake a series of missions against a terrorist organisation who are threatening the safety of the world. There are a series of short missions which can be played in groups or alone, with the player taking a role in different gameplay modes such as hostage rescuing. In undertaking these online missions Robert could visit different virtual rooms virtually, roam the game environment and manipulate objects in both his physical and virtual environments – his game controller, his chair, the use of the remote control, the placing of cameras, bombs etc and the ability to collaborate or not with other players, albeit online players. In a similar way, the students in the game-based lesson had the freedom to roam the physical location of the school. Where Robert's experiences in *Rainbow Six Siege* differed from the students in the Computing lesson was the ability to break off his online activities, to get involved in 'cheating', as his imposed lagging glitch would be regarded by fellow players of *Rainbow Six Siege*. He also had no over-arching learning goals, such as knowledge of Cryptography, imposed by an external authority such as the teacher, even if this authority was not visible to students in the Cryptography lesson. In *Rainbow Six Siege* players have some freedom to explore the gaming environment but have to perform the correct pre-defined moves in order to make progress in the game.

The fate of the world is at your hands!

You are sat watching television when the following message appears:

Computer hackers have forced their way into the systems on board HMS Vigilant.

This submarine is famous for carrying some of the United Kingdom's nuclear weapons known as Trident. The missile codes for these weapons of mass destruction have been cracked and the launch procedure is imminent.

You have **45 minutes** to save the world.

Are you a code breaker?
Are you a hero?

Don't waste any time. The world relies on you. Use the resources around you to get to the next room on OneNote.

A .–	J .–––	S ...	2 ..–––
B –...	K –.–	T –	3 ...––
C –.–.	L .–..	U ..–	4 ....–
D –..	M ––	V ...–	5 .....
E .	N –.	W .––	6 –....
F ..–.	O –––	X –..–	7 ––...
G ––.	P .––.	Y –.––	8 –––..
H	Q ––.–	Z ––..	9 ––––.
I ..	R .–.	1 .––––	0 –––––

TIP: ALL codes are lowercase

You have now worked out that secret signals are been transmitted around the world to ask for help using Morse code.

You travel down to HMS Vigilant to help but need to get through the gate. Work out the key to gain access to the port.

The key to get through the port security gate is:

Figure 76 Escape Room activity in OneNote Class Notebook

This was certainly the case in the classroom Escape Room activity. After the first activity the teacher relinquished all visible authority allowing students to approach tasks as they saw fit. Since many tasks necessitated leaving the classroom, the initial model of working individually and competitively soon broke down. Most students worked voluntarily in groups, dividing the tasks between them. After the first clue, the Morse Code task was solved and subsequent clues were found by physically visiting various sites around the school building to retrieve them. Once retrieved they could be used to unlock or decrypt the next online section in their OneNote Notebook in a similar way to a puzzle game where different parts of a map are revealed. By structuring the escape room activity to require physical movement and interaction with the school building itself, relations between objects, technology and context were re-organised and regulated. Whichever role students decided to take during the process, all students had to physically interact with the materiality of online OneNote Notebook (Fig 76) to progress. They had to enter information, click on links and so on, just as they would in a digital game. However, unlike traditional lessons, students were not restricted to individual means of collecting this information. They could and did choose to share information and help each other in a similar way to game play outside school, where cheats, walkthroughs, playthroughs are commonly used to solve problems. There was also no requirement to engage through hand-written responses. Students who would normally be disadvantaged by their handwriting ability had the potential to demonstrate their engagement in other ways.

Game design elements, such as time limits to inject urgency and the freedom to explore and collaborate meant that experience and participation was different for different students depending on how they materially engaged with the lesson activity (Ash & Gallacher, 2011). This is a mark of invisible pedagogy, where space is less constrained and movement less regulated (Bernstein, 2004). Affective engagement emerged through the freedom to move around in a space which extended beyond the

classroom wall, whether a student chose to take advantage of such movement or not. Written feedback was provided by students at the end of the session in response to a teacher survey in OneNote (Appendix 12) which confirmed that engagement was both affective and cognitive. Every student commented favourably on the physical materiality of the lesson calling it 'practical' and 'fun' and were able to use the terms 'encrypt' and 'decrypt' with understanding, both in the lesson and in feedback.

Disengagement also emerged from this lesson assemblage. Duncan (2014) notes that game informed learning can be in direct conflict with what many students expect and want from formal learning. In this lesson some students were clearly unhappy about taking part in an activity which encouraged them to take a less efficient means to achieve the goal of understanding cryptography. Rather than being able to access visible pedagogical structures such as teacher assistance and direct instruction, they had to work through a series of challenging activities to achieve the same end. The teacher, usually the most dominant actor in a lesson assemblage, instead took on the role of the timer, issuing verbal reminders to inject pace, in the way that an on-screen timer normally would. Some students were uncomfortable with the shift in agency and the disruption of such a stabilised and entrenched practice as teacher-led instruction. Their dissatisfaction was expressed through regular requests to the teacher for help, feedback on individual progress and through comments about not knowing what to do next.

The role of adults in this lesson drew attention to the way in which power relations are normally entrenched through visible pedagogical practices. As the only other adult in the room it would not have been unreasonable for students to turn to me to replace the teacher role. However, this did not happen. Instead, as the lesson progressed, students not directly involved in my research but nevertheless aware of my gameplaying interests, attempted to recruit me as a fellow collaborator in their activities. They saw me as part of their 'interest group' as game players, as an experienced peer

rather than a replacement authority figure. The teacher, on the other hand, neither positioned himself as a learner, as the teacher had in the English Intervention lesson in an earlier section, nor as the authority figure. However, the space created here may give the teacher an opportunity for a more negotiated and flexible teacher-student relationship (Gee, Siyahhan and Cirelli, 2017).

I am not arguing here for the replacement of teaching with learning, but like Biesta (2013), I argue that students should learn *from* teachers rather than be taught *by* them. In invisible pedagogy students learn *from* teachers – although control is implicit, the teacher still makes the judgement about what needs to be learnt and when but can adjust and steer this to suit the student. In the Cryptography lesson, invisible pedagogical practices in the form of gaming principles, created different power relations through a different organisation of space-time relations. It put students in a position of 'mastery' rather than mere 'receptivity' (ibid. p.42), a position which appears to lead to more 'affective engagement' in the learning process. Similarly, the use of technology in the form of OneNote Class Notebook, altered the power relations in the lesson assemblage. The implicit control of learning, through provision of content and teacher surveillance in OneNote Notebook provided more flexible affordances within the classroom setting and with it, ways for engagement to emerge. However, as Duncan (2014) states, using game principles in one lesson is a different thing to doing it throughout the curriculum or an institution – he calls for further research into how institutional structures can be transformed to support the situated learning that games and learning research is advocating. Re-thinking sociomaterial practices and re-organising structures in schools to support a more varied approach to the use of time and space and consideration of game principles could help us to re-imagine boredom and disengagement from formal learning.

5.4 Summary

In this chapter I have explored the extent to which digital gaming can provide a productive contrast with classroom practices and illuminate our understanding of boredom and disengagement from formal learning. In the first section I used the 'games *for* learning' framing to consider the role of *Minecraft* in School E, not simply as a tool to be used and manipulated by teachers to achieve educational goals but as a boundary object which stays recognisable across different situations such as *Minecraft* Club and English Intervention lessons enabling students to make connections between knowledge gained in and out-of-school. I compared this to a commercial digital game called *FIFA*.

In English Intervention lessons *Minecraft* did appear to act as a boundary object, disrupting hierarchical relations between teacher and student through the introduction of iPads, the *Minecraft* game and an unconventional seating plan. Students became experts, bringing the knowledge they had gained about both iPad devices and digital gaming in out-of-school settings into the classroom. However, typical relations were quickly re-established through the agency of objects such as the lesson booklet which emphasised the dominance of writing in the performance of engagement. The potential for disengagement to emerge from the framing *Minecraft* practices as writing was high. Such a framing constrained performances of engagement because of the repetitive nature of the activity and was compared to similar activity in digital games, called 'grinding'. Instead an alternative model was offered where the affordances of the virtual *Minecraft* environment could become the focus for lesson activity rather than a means to an end.

In comparison to *Minecraft*, *FIFA*, which was played in an after-school club, was successful as a boundary object. In contrast to *Minecraft*, activity within the *FIFA* game was central to relations in the gaming club, not a means to

achieve an educational goal. The lack of spatio-temporal constraints and established schooling practices enabled students to demonstrate expertise acquired out-of-school but create connections between in and out-of-school activities. In addition, much affective engagement was generated by the non-hierarchical relationships with teachers which was possible in this alternative assemblage.

In the second section I explored the concept of games *as* learning through the spatio-temporal practices in digital games, in a comparison of *Minecraft* Club with two commercial games, *Rainbow Six Siege* and *The Turing Test*. Although *Minecraft* Club did operate within the constraints and affordances of a physical classroom setting, spatio-temporal arrangements were more flexible, giving students more agency to participate in ways which engaged them affectively. Burnett's (2014) concept of 'classroomness' with creation of unofficial spaces was used to explore students' performances of engagement both in the physical environment of the classroom and the virtual *Minecraft* world where students were free to pursue varied interests ranging from coding, to building and PvP.

The analysis of gameplay in the commercial game *The Turing Test* demonstrated that the differing relations encountered in a home gameplay session do not always result in higher engagement. Single player games can become frustrating for the player without the scaffolding provided by a teacher or the input of fellow students or other players in a multi-player game. However, unlike the classroom, Dylan was free to perform disengagement or frustration with few negative consequences and even to cease participation entirely.

The organisation of time as sequential activity in English lessons was contrasted with a gaming session in *Rainbow Six Siege* where a technically-induced phenomenon called 'lagging' caused the perception of time passing slowly, which is commonly associated with boredom. Agency over time constraints in classrooms and games differs, however. Whilst the

gameplayer, Robert, was able to take steps to mitigate the lagging problem, students in a classroom tend to have little control over pace or the ability to manipulate sequential activity by, for example, multi-tasking.

In the final section I evaluated whether gaming *with* learning, which encourages us to capitalise on the complex interrelations between the design of games and learning practices, can help re-structure social and material relations in the classroom and help teachers design engaging learning experiences. Through the analysis of a game informed lesson on Cryptography, I explored how affective engagement might be created by presenting a range of affordances and constraints around movement; relations between students and students and teacher; the ability to manipulate and access information and the ability to choose differing performances of engagement through the provision of an electronic notebook, OneNote.

In the conclusion I return to my research questions, briefly evaluating the extent to which this study has been able to address them. I conclude by considering the limitations of the study, how it has contributed to existing knowledge and methodology and make recommendations for future work.

Chapter 6 Conclusion

6.0 Introduction

> It is the task of critical educators to create the sociomaterial conditions for pupils to enact a different reality which challenges the dominant forms.
>
> (Postma, 2012 p.20)

This study has argued that the current emphasis on high stakes assessment and accountability in English secondary schools and the need for predictable outcomes has produced schooling practices which are leading to student disengagement. It has taken issue with the tendency towards narrow interpretations of boredom and disengagement which rely on representations of student behaviour, attitude and achievement, arguing that these may have restricted educational research and opportunities for intervention. Instead, I have proposed framing education as a spatial practice, and re-imagining disengagement as performative rather than representational. Such a shift allows us to consider different enactments of boredom and disengagement and to theorise more richly about relations which may have produced these phenomena. I have further suggested that digital gaming practices, already part of formal classroom learning, offer potential to provide a productive contrast with traditional classroom practices. Through their more dynamic, mobile and adaptable relations, they can disrupt the notion of practices as immutable, entrenched and untouchable and encourage teachers to consider ways in which they could intervene to create affective classroom atmospheres which might prevent boredom and disengagement emerging.

In this chapter I review each of these issues, beginning with the role of high stakes assessment, followed by the tendency to define boredom and disengagement narrowly and the impact of this on research. I then provide

a summary of the impact of framing education as spatial practice and evaluate the extent to which digital gaming provides a productive contrast in terms of understanding boredom and disengagement in the classroom. The final sections of the chapter consider the limitations and implications of my research, particularly in the light of the current COVID 19 crisis and the huge move to online learning in schools across the globe. I end by making recommendations for future practice and research.

6.1 Disengagement and the role of high stakes assessment

This study has argued that the current emphasis on high stakes assessment and accountability in English secondary schools and the need for predictable outcomes has produced schooling practices which are leading to student disengagement. As Page (2017) and Biesta (2015) point out, if education is regarded as a closed system, with direct links between cause and effect, there is likely to be considerable pressure to standardise lesson plans and schemes of work, normalise patterns of marking and feedback to ensure that outcomes are measurable and free of risk. The review of research literature in Chapter 2 suggests that the impact of high stakes testing has resulted in curricula narrowing, lessons becoming more teacher-led and learning activities less varied (Macklem 2015), with more emphasis on the transmission of knowledge and on writing as the principal mode of expression for both teachers and students. These factors contribute to boredom and ultimately to disengagement from formal learning.

As discussed in Chapters 4 and 5, empirical data obtained in secondary school classrooms in South Yorkshire confirm that teaching and learning practices have a direct effect on the affect, agency and participation of students in the classroom. If those practices become too standardised, restrictive and repetitive, they may result in boredom and disengagement. Bernstein (2004) and Biesta (2015) both discuss how an emphasis on high

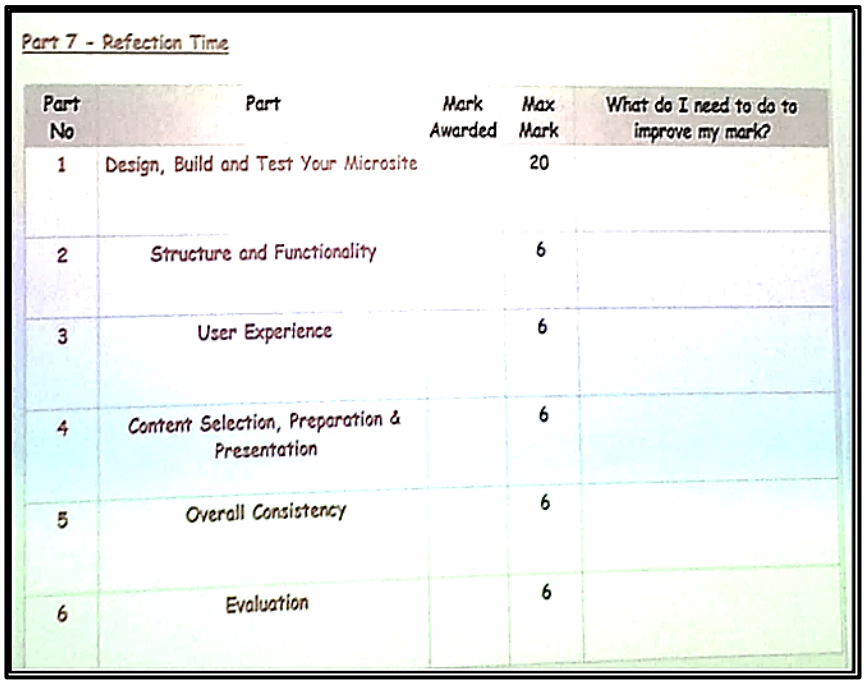
stakes assessment and education as based on an input-output model, lend themselves to what Bernstein calls 'visible pedagogy' and promote particular ways of structuring space and time, which in turn can produce boredom and disengagement. Visible pedagogy has rules which readily translate into performance indicators and standardised schemes of work and can result in an over-emphasis on target-setting, written feedback and interventions of the sort described in Section 4.3.3.

Where visible pedagogy predominates, agency stays largely with the teacher and participation by students takes the form of exam performance and the production of texts which satisfy assessment criteria. The focus in the classroom is on the behaviour of students and how to control that behaviour so that teachers are able to make the most efficient use of time and space and achieve the goal of good exam results. In order for this to occur power relations need to favour hierarchical relationships between teachers and students. Student participation becomes what Biesta (2015) calls pseudo participation when activity is set and controlled by others. Such relations tend to become demotivating for students.

Tension can be created between active and sedentary learning, since high stakes testing emphasises 'having' knowledge rather than 'doing' (Kamstrupp 2016, p.891). High stakes assessment and predictability necessitate efficient and effective use of lesson time and space if prescribed content is to be acquired. Space, like time, expresses the power relations between teachers and students, regulating participation and limiting agency which influences affective engagement. Student passivity is seen as desirable, therefore behaviour needs to be controlled and teacher talk privileged. Classroom layout and seating plans are used to ensure that this happens. Diversions from delivery of planned content are discouraged as discussed in section 4.2.3, where students' attention was drawn to a tank containing terrapins.

Highly standardised processes and procedures such as Dedicated

Improvement and Reflection Time (D.I.R.T) have also been developed to get students to reflect on their learning. The purpose of D.I.R.T is two-fold – to provide evidence of the feedback cycle for lesson observations and OFSTED inspections and to teach students how to meet assessment criteria (Section 4.3.3). Because the goals of D.I.R.T sessions are imposed by teachers and the assessment criteria, many students and teachers see the process as boring and repetitive and often fail to make the connection between the completion of proformas and 'correction of work' and future learning tasks.



Part 7 - Refection Time

Part No	Part	Mark Awarded	Max Mark	What do I need to do to improve my mark?
1	Design, Build and Test Your Microsite		20	
2	Structure and Functionality		6	
3	User Experience		6	
4	Content Selection, Preparation & Presentation		6	
5	Overall Consistency		6	
6	Evaluation		6	

Figure 77 Electronic version of Computing assessment criteria

Even digital versions of D.I.R.T sessions, which students found marginally more engaging, were based on external criteria as can be seen in the checklist in Figure 77 above.

Many classroom practices, particularly those associated with writing, are highly prescribed to ensure they are consistently satisfying assessment criteria. Visual reminders of how texts need to be structured and controlled abound in classrooms as illustrated in Fig 57 (p.197) and Fig 58 (p.199). However, the overwhelming use of writing, specifically handwritten texts, can

be disengaging, especially for students whose handwriting is poor (p201-202).

Spatio-temporal regulation and organisation is designed to ensure the efficient delivery of content which will be tested by GCSE examinations at the end of secondary education. Artefacts such as the timetable are used to orchestrate a stable network of social and material relations. Space is also expressed through time since it locates students, staff, technology and objects in particular relations. The necessity for students, teachers, resources and location to be materially present, at the same time in the same place, to acquire a specific body of knowledge creates an enactment of presence and engagement in formal learning which is inextricably bound to the ultimate goal of achieving predictable outcomes. The shift to online learning during the COVID 19 pandemic has disrupted such predictable outcomes, particularly GCSE examinations, but also introduced very different spatio-temporal organisation and regulation for students and teachers. Assemblages of technology, people and environment have become highly mobile and unstable, with new affordances and constraints which are more similar to those in digital games where spatio-temporal framings are much more complex and fluid, based around events rather than material artefacts such as timetables (Section 5.2.2) and seating plans.

6.2 Interpretations of boredom and disengagement

Educational research into boredom rarely considers it as a major contributory factor in disengagement from formal learning. Instead it tends to be regarded as a widespread and inevitable part of the schooling process, a human emotion which can be addressed by encouraging students to self-regulate and to develop boredom coping skills. By regarding boredom as an inner mental state and disengagement as the behaviour which follows there is a danger of over-simplifying these complex phenomena. Opportunities for intervention are reduced to modifying the individual

behaviour and attitudes needed to maintaining institutional values - regular attendance, compliant behaviour, focused attention and appropriate responses - at the expense of exploring how affect is created through interrelations between people, technology and environment.

Most educational research into boredom and disengagement/engagement does consider the role of environment, technology, relationships with teachers, pedagogical design (Shernoff et al., 2016) in addition to the individual student and their emotional reactions in the classroom. However, sociomaterial approaches widen the opportunities for teachers to consider the participation and agency of a whole range of elements within the learning process, which in turn, present a greater range of possibilities for intervention. Such an approach enables us to explore how power relations become inscribed in social and material practice; patterns of engagement become perpetuated and suggest ways in which relations between elements in networks can be re-distributed in order to disrupt norms which may cause boredom and disengagement to emerge.

6.3 Re-framing classroom education as a spatial practice

As Fenwick (2012) reminds us, perceptions of classrooms and schools as containers, or black boxes, discourage scrutiny and review of stable practices which appear natural and not open to intervention or innovation. Classroom practices developed around education policy and assessment become difficult to challenge as they become mutually defining. If engagement/disengagement can be regarded as a phenomenon produced by a network of relations between students, classrooms, gaming spaces and learning activities, binaries such as formal and informal and in school and out of school learning become irrelevant because context is no longer a 'black box' within which learning occurs. If we include the participation of the material in educational practices we can explore

different modes of participation and shift our focus from affect as the emotional reaction of an individual to affect as the ability of one element in an assemblage to act upon another. Productive comparisons can then be made between the assembling of elements in classroom practice and the way in which games produce relations through touch and visual image, altering the nature of participation and revealing how different enactments of engagement are promoted.

A sociomaterial approach opens space for multiple performances of engagement by encouraging teachers to intervene in classroom practices to alter the affective experience of learning by changing affordances and constraints available for individual students to engage. Awareness of spatial and temporal boundaries and re-organisation of the ways staff and students can participate socially and materially can contribute to a positive affective atmosphere.

6.4 Digital gaming; productive contrast with classroom practice?

Educational research has tended to frame games and gaming practices in two ways; as 'games *for* learning' and 'games *as* learning' (Duncan, 2016). In a 'games for learning' framing, digital games become simply objects to be manipulated by teachers or students. Similarly, in this framing, boredom and disengagement with a game are seen merely as attributes of the individual student. As such, there is no particular value in comparing engagement in digital games and formal learning. Games become tools alongside exercise books, pens, textbooks and computers. As demonstrated in this study, when games such as *Minecraft* are used as a tool, manipulated by the teacher for the purpose of improving instructional writing, boredom and disengagement emerge. Rather than the intervention it was designed to be, *Minecraft* becomes part of school 'stuff', alongside pens, exercise books because engagement with the game was still prescribed by school practices and expectations.

'Games *as* learning' regard games as systems within which learning activities and practices are embedded. This framing enables us to consider gaming as an assemblage of human and non-human actors and disengagement as emerging from that assemblage. Recent research literature concerned with gameplay experiences and engagement has embraced ideas of assemblage, place as event and distributive agency. Research which directly compares gaming experiences to formal learning (Bailey, 2017; Johnston, 2018; Leander and Lovvorn, 2006) concludes that the disengagement which is produced in classrooms is due to the relative immobility of actors, to normed expectations of student engagement and to the constraints of institutional norms and routines and stress importance of dynamic, mobile relations between actors for creating affective engagement. Gaming tends to produce more complex affordances for participation and organise time and space in ways which mean embodied activity is experienced differently to the classroom. Digital gameplay can be experienced in multiple settings via mobile devices and through different flows of time such as real-world time, gameworld time, co-ordination time and fictive time (Zagal & Mateas, 2015).

This being said, both gaming and classroom practices can become immobile and produce disengagement, as has been demonstrated in this study. The organisation of time through artefacts such as digital timers and game mechanics such as 'rounds' have agency in assemblages which produce specific affective experiences for the human participants. The perception of time passing slowly, which is strongly associated with boredom, can be generated through the over-use of repetitive activities. Such activities are a feature of games as well as classrooms and appear to produce disengagement in a similar manner to sequential formal learning tasks in schools. A key element of engagement with gaming is network continuity (Leander and Lovvorn, 2006) the way in which a text or other object circulates in a network. Cuts in continuity tend to produce disengagement, for example, when a text is produced in the classroom and handed in for marking. In gaming, such cuts are less common because the

player has agency over continuity and the circulation of feedback from action (section 5.2.2). Finally, gaming practices can provide the material means to create spaces where peer support is more prominent and hierarchical relations between teacher and student can be re-organised (section 5.3.2), so that alternative sources of knowledge and ways of demonstrating engagement can be valued.

6.5 Limitations of study

Sociomaterial ethnography is still a relatively new approach in educational research and as described in Chapter 3, an approach that I came to halfway through my research. As such, I discuss some of the issues and limitations and their implications for my study and future research in this area, beginning with research sites and moving on to consider the selection of participants and the implications for my researcher role.

Some of the limitations of this study are a direct result of my change in direction in terms of ontology and epistemology. Halfway through my study I changed from a narrative ethnographic approach to a sociomaterial one. Rather than attempting to understand disengagement through the accounts of participants, as I have outlined in detail in my previous section 6.2, I recognised the limitations inherent in such an approach. The change to Actor Network Theory and assemblage theory influenced research sites, the type of data which was collected and my role as researcher.

Digital gaming was a key research site in this study. My work specifically sought to use non-educational games (games not designed explicitly for education) such as *Minecraft, The Turing Test* and *Rainbow Six Siege* because their characteristics and practices are distinct from those of the classroom. I have considered how such games may act as boundary objects, enabling links between students' own knowledge and that which

they acquire in the classroom. Future work might usefully compare the experience of playing games specifically designed for education such as *Ruby Rei*[46], an adventure game for language learners, with non-educational games such as *Rainbow Six Siege* and *FIFA*. Research should consider how the need for specific outcomes and content in educational games alters the affordances and constraints and, by association, the ways in which players/students can participate and how affective engagement is generated.

Other research sites such as lunchtime and after school gaming clubs allowed me to observe the gaming practices of my participants from *within* a schooling assemblage and to focus on links with classroom practices. This also had advantages in terms of ethical approval. Although beyond the scope of my study, direct access to home gameplay experiences would have provided an even richer account, as would my embodied presence alongside participants in the virtual *Minecraft world*. In classroom observations, for example, my physical presence affected the assemblage and reconfigured it. In sociomaterial ethnography the researcher is part of the assemblage being studied – situations are brought about through social and material elements intermingling (Macleod et al. (2019). Landri (2013) points out that as education and learning become more complex, ethnographic fieldwork is going through a process of remediation and what it means for a researcher to 'be there' in a field site. By listening to an audio-recording of gameplay *after* the event, I was comparing assemblages which had been configured differently to the lessons I observed. As Dezuanni (2018) did in his study of *Minecraft* play at home, I used audio recordings to recreate gameplay but also to back up written observations in the classroom. There are few empirical studies (Baroutsis 2018; Dezuanni 2018; Hollett and Ehret 2015) of either classrooms or digital gaming which explicitly

[46] Ruby Rei - A language-learning adventure game produced by Wibbu Ltd and Cambridge Assessment. Ruby crash-lands on a forgotten planet at the edge of the universe and playing as Ruby you explore the environment using your language skills in a designated language to navigate obstacles. Video available: https://www.youtube.com/watch?v=NrHUdm_8MEE

consider the changing role of the sociomaterial ethnographic researcher, with Bailey (2017) being a notable exception. Future sociomaterial ethnographies in this area might consider the effect of the researcher's presence on engagement in gaming and classroom practices.

As I have mentioned previously, the individual characteristics of the human participants was not my principle focus in this study, but rather the social and material relations between humans and objects, locations and technologies in classrooms and games. The purpose of this study was to provide an in-depth, rich account of the practices of a small number of participants in gaming and classrooms. The research site I constructed in *Minecraft* Club and through which I selected my core participants did result in limitations with regard to the demographics of those participants. My participants were all male, with three of the five diagnosed with attention or learning difficulties, ranging from autism to dyslexia, as I have discussed in section 3.3.4.4. That being said, the *Minecraft* game does have a higher proportion of male players (Mavoa, 2017). In addition, the freedom and open-endedness of the game also tends to suit players with disorders such as ASD and dyslexia (O'Sullivan et al. 2017) making it not altogether surprising that a high proportion of School E's Minecraft Club members shared these characteristics.

In future research, on the other hand, it would be interesting to contrast my in-depth, thick description of sociomaterial practices with a larger study following students of all genders and of different age groups and to collect similar data in a number of different schools, rather than one case study school as I did here. I am very aware that schools vary in the way that they react to the demands of high stakes assessment, for example. Some schools have taken control of time and space in creative ways which would be interesting to explore in future work. The data I collected within School E was, by its nature, designed to sample a small range of lessons and subjects – what is analysed in this study is merely a snapshot of classroom experiences. As with most ethnographic study, the findings I present here were not

intended to be generalisable to all schools, particularly since England, Wales, Scotland and Northern Ireland all have variations in the way their school systems operate.

A more recent limitation to my fieldwork has arisen during the COVID 19 pandemic. Although I have made passing reference to the ways in which online learning appears to be changing school learning practices it would have been very valuable to have had the opportunity to include empirical data and fully discuss the implications of the COVID 19 pandemic on the way that formal learning is organised and assessed. I discuss this briefly in the final section of this conclusion.

6.6 Implications and recommendations for future research

6.6.1 Implications for practice

The purpose of this study was to not only challenge the way boredom and disengagement is defined in formal learning contexts but also to use digital games to re-evaluate schooling practices in England and suggest interventions which might prevent boredom and disengagement emerging.

Perhaps one of the most important ideas to emerge in this study is the major role that the organisation and regulation of time and space in schools has on the affective experience of the student. The demands of high stakes assessment and the need for predictable outcomes often dictate the use of timetables and seating plans to regulate the relations between student, teacher, resources and space. In games, the lack of spatio-temporal artefacts such as timetables and seating plans create opportunities for multiple enactments of engagement, through a wide range of affordances and constraints. A key part of any re-evaluation of schooling practices

should be to develop formal learning practices which are less reliant on the demands of external assessment and place more value on teacher's dynamic judgement of learning situations.

By increasing the mobility of actors in assemblages, different affective dynamics can be achieved. Distributing agency between student, teacher, equipment and environment can be achieved in a variety of ways. Boredom is perceived as a lack of 'doing', creating a tension between being active and sedentary in the classroom. Current practices in schools emphasise sedentary activities because of the emphasis on direct instruction and the dominant agency of the 'teacher zone' in classroom spaces. Altering the affordances and constraints available in learning situations can change this perception. Allowing students to move physically around a space in order to unlock key information or to access and select from a range of available resources to tackle a task can be used to great effect, as I observed in both gaming situations and Science (p.175) and Computing lessons (section 5.3.2).

However, a sense of 'doing' can be created without physical movement, but through creating the illusion of movement or impetus as most digital games do. Games produce interrelations between player, game controller and game through touch and visual image. Teachers could create opportunities for students to explore and respond to tasks in a variety of ways. Rather than restricting participation to reading and responses to handwritten texts, more tactile and embodied responses should be encouraged. Simple measures could include giving students the ability to choose between a handwritten or more multimodal response such as the creation of a virtual artefact in Minecraft to provide evidence of learning.

Being able to use a variety of technological devices, such as tablets, phones, laptops or PCs, to achieve the goals of the learning task may also contribute to the creation of a different affective atmosphere of the classroom. The development of more flexible assessment criteria which

included oral, digital and practical responses to questions would ensure the maintenance of predictable outcomes. The need for predictability should not lead to the over-standardisation of teaching and learning practices. Standardisation is desirable to ensure consistency of student experience but not at the expense of engagement.

Network continuity (Leander & Lovvorn, 2006), or the way in which a text or other object circulates in a network, is a key part of how engagement is maintained in digital gaming. Classroom practices can often be designed in ways which result in constant cuts in this continuity, causing boredom and disengagement to emerge. Repetitive activities are a necessary part of both gaming and formal learning, where practice in the performance of a skill is vital. However, over-use of repetition, such as standardised lesson structures or the creation of 'busy work' or 'grinding' in games, can lead to cuts in continuity, disrupting the accumulation of knowledge or skills. Reflection on learning has taken on a high level of standardisation and repetition in many schools. Unlike games, where feedback is personalised, visual and immediate, as I discussed in section 4.3.3, reflection on learning in schools tends to consist of standardised and formulaic written responses, overly focussed on material elements such as pen colour and proformas and the de-contextualised reference to assessment criteria, rendering the process meaningless. More flexible and imaginative ways to reflect on learning are essential, such as the greater use of peer feedback, oral responses by teachers, model answers and online simultaneous commenting on draft work. Effective peer feedback relies on the creation of learning spaces where peer support and collaboration are normalised and valued. Feedback on work produced should not always be tied to assessment criteria either, but to the impact it creates. For example, in English there has always been a tradition of writing for real audiences on blogs and encouraging feedback from the wider public. In Technology, artefacts can be created for use in school, with feedback in the form of popularity and uptake in the use of a manufactured object.

My findings suggest that engagement could also be increased if adult-child relations were sometimes less hierarchical with regular opportunities for students to exhibit their expertise, particularly around the use of ubiquitous technology such as mobile phones and tablets and to develop their own interests and expertise. In this way they could be encouraged to make links between their out-of-school and in-school knowledge and to evaluate alternative sources of knowledge such as Google and YouTube. As Hampson, Patton and Shanks (2013) point out, by taking students' views into account schools can:

> …help students to work in complementary ways alongside teachers, enabling them to play a more active part in shaping their own education and that of their peers (p.17)

6.6.2 Recommendations for future research

In the final months of writing up this study an unprecedented event occurred, which had a massive effect on schooling practices world-wide. During the first few months of the COVID 19 global pandemic schools were closed, teaching and learning was no longer done face-to-face and high stakes assessment, such as GCSE examinations, was cancelled. This has huge implications for any future research which shares my sociomaterial approach to consider the way students engage in formal learning. Due to the late stage of my thesis I have been unable to consider fully what those implications might be.

However, between March and July 2020, in my role as a digital educational consultant I was asked to support a group of 12 primary schools, part of a multi-academy trust in Nottinghamshire. I observed first-hand how relations between teachers and students changed with the huge shift towards online learning. Although online learning introduces very different spatio-temporal affordances and constraints for teachers and students, they still have the

potential to create affective assemblages from which boredom and disengagement can emerge. Learning spaces are less likely to be contained within the black box of the physical school building and classroom. They are much more likely to be created by assemblages of technology, people and environment which, though highly mobile and unstable, can create new opportunities to prevent boredom and disengagement emerging. Future research should incorporate sociomaterial approaches which encourage us to see schools as networks rather than bounded, stable places or 'static containers'. Teachers can incorporate what has been learnt from digital gaming practices and look beyond the usual distinctions between formal/informal learning and in and out of school practices in order to re-evaluate the experience of learning in the classroom, as I have outlined in the previous section.

COVID 19 may have inadvertently provided the perfect opportunity to implement and evaluate the recommendations of this thesis.

References

Alexander, R.J. ed., 2009. *Towards a new primary curriculum: A report from the Cambridge Primary Review. The Future*. Available at: https://cprtrust.org.uk/wp-content/uploads/2014/06/Curriculum-report-2.pdf [Last accessed 18/02/14].

Apperley, T., 2010. What games studies can teach us about videogames in the English and Literacy classroom. *Australian Journal of Language and Literacy, THE*, *33*(1), p.12.

Apperley, T. H. & Jayemane, D., 2012. Game studies' material turn. *Westminster Papers in Communication & Culture*, 9.

Arnone, M., Small, R., Chauncey, S. & Mckenna, H., 2011. Curiosity, interest and engagement in technology-pervasive learning environments: a new research agenda. *Educational Technology Research & Development*, *59*, 181-198.

Ash, J., 2009. Emerging spatialities of the screen: video games and the reconfiguration of spatial awareness. *Environment and Planning A*, *41*, 2105-2124.

Ash, J. & Gallacher, L. A., 2011. Cultural geography and videogames. *Geography Compass*, 5, 351-368.

Bailey, C.J., 2017. *Investigating the lived experience of an after-school Minecraft club* [Doctoral dissertation, Sheffield Hallam University].

Banks, M., 2001. *Visual methods in social research*. Sage.

Baroutsis, A., 2018. Sociomaterial assemblages, entanglements and text production: Mapping pedagogic practices using time-lapse photography. *Journal of Early Childhood Literacy,* p.1468798418784128.

Baroutsis, A., Comber, B. and Woods, A., 2017. Social Geography, Space, and Place in Education. *Oxford Research Encyclopedia of Education*.

Bayne, S., Gallagher, M.S. & Lamb, J., 2014. Being 'at' university: the social topologies of distance students. *Higher Education,* 67**,** 569-583.

Beauchamp, G. and Parkinson, J., 2005. Beyond the 'wow' factor: developing interactivity with the interactive whiteboard.

Belton, T. & Priyadharshini, E., 2007. Boredom and schooling: a cross-disciplinary exploration. *Cambridge Journal of Education, 37*(4), pp. 579-595.

Bennett, T., 2016. Blocked: *Minecraft* and the taboos in education. *Tom Bennett's School Report. Available at*: http://behaviourguru.blogspot.com/2016/11/blocked-minecraft-and-taboos-in.html [Last accessed 22/11/19]

Bernstein, B., 1975. Class and pedagogies: Visible and invisible. *Educational Studies*, *1*, 23-41.

Bernstein, B., 2004. *The structuring of pedagogic discourse*. Routledge.

Bhatt, I. and de Roock, R., 2013 Capturing the sociomateriality of digital literacy events. *Research in learning technology, 21*(4).

Bhatt, I., De Roock, R. & Adams, J., 2015. Diving deep into digital literacy: emerging methods for research. *Language and Education*, 29, 477-492.

Bielaczyc, K. and Collins, A., 1999 Learning communities in classrooms: A reconceptualization of educational practice. *Instructional-design theories and models: A new paradigm of instructional theory, 2*, pp. 269-292.

Biesta, G. J., 2013. Giving teaching back to education: Responding to the disappearance of the teacher. *Phenomenology & Practice*, 6, 35-49.

Biesta, G.J., 2015. *Beautiful risk of education*. Routledge.

Biesta, G., 2016, Knowledge and the curriculum: a pragmatist approach. In *The Sage Handbook of Curriculum, Pedagogy and Assessment: two volume set*. [Last accessed: 31/01/19] doi: 10.4135/9781473921405.n5.

Breidenstein, G., 2007. The meaning of boredom in school lessons. Participant observation in the seventh and eighth form. *Ethnography and education*, *2*(1), pp.93-108.

Bricker, L. A. & Bell, P., 2012. "GodMode is his video game name": situating learning and identity in structures of social practice. *Cultural Studies of Science Education*, *7*, 883-902.

Bryson, C. & Hand, L., 2007. The role of engagement in inspiring teaching and learning. *Innovations in Education & Teaching International*, *44*, 349-362.

Bulkhead Interactive. 2016. The Turing Test. Square Enix.

Burr, V., 2003. *Social constructionism.* Psychology Press.

Burnett, C., 2014. Investigating pupils' interactions around digital texts: A spatial perspective on the "classroom-ness" of digital literacy practices in schools. *Educational Review*, *66*(2), pp.192-209.

Burnett, C. and Merchant, G., 2014. Points of view: Reconceptualising literacies through an exploration of adult and child interactions in a virtual world. *Journal of Research in Reading*, *37*(1), pp.36-50.

Burnett, C., Merchant, G., Simpson, A. & Walsh, M., 2017. *The case of the iPad: Mobile literacies in education.* Springer.

Callaghan, N., 2016. Investigating the role of *Minecraft* in educational learning environments. *Educational Media International*, *53*(4), pp.244-260.

Calleja, G., 2007. Revising Immersion: A Conceptual Model for the Analysis of Digital Game Involvement. DiGRA Conference.

Carriere, J.S., Cheyne, J.A. & Smilek, D., 2008. Everyday attention lapses and memory failures: The affective consequences of mindlessness. *Consciousness and cognition*, *17*(3), pp.835-847.

Carroll, J., 2016. Leveraging boys' engagement with gaming for improving literacy. *Literacy Learning: The Middle Years*, *24*, 53.

Christenson, S., Reschly, A. L. & Wylie, C., 2012. *Handbook of research on student engagement*. Springer.

Consalvo, M., 2009. *Cheating: Gaining advantage in videogames*. MIT Press.

Cook, S.D. and Brown, J.S., 1999. Bridging epistemologies: The generative dance between organizational knowledge and organizational knowing. *Organization science*, *10*(4), pp.381-400.

Crook, C., 2012. The 'digital native' in context: tensions associated with importing Web 2.0 practices into the school setting. *Oxford Review of Education*, *38*, 63-80.

Cypher, M. & Richardson, I., 2006. An actor-network approach to games and virtual environments. *Proceedings of the 2006 International Conference on Game Research and Development*. Murdoch University, 254-259.

Csikszentmihalyi, M., 1997. Flow and education. *NAMTA journal, 22(2), pp.2-35.*

Dant, T., 2004. The driver-car. *Theory, culture & society*, *21*(4-5), pp.61-79.

Davies, M., 2009. Examining game pace: How single-player levels tick. *Gamasutra, May,12*. Available at: https://www.gamasutra.com/view/feature/132415/examining_game_pace_how_.php [Last accessed: 20/04/20]

Decuypere, M. And Simons, M., 2016. Relational thinking in education: Topology, sociomaterial studies, and figures. *Pedagogy, Culture & Society*, *24*(3), pp.371-386.

Deleuze, G. & Guattari, F., 1988. *A thousand plateaus: Capitalism and schizophrenia*. Bloomsbury Publishing.

Deterding, S., Dixon, D., Khaled, R. And Nacke, L., 2011. From game design elements to gamefulness: defining gamification. In *Proceedings of the 15th International Academic Mindtrek Conference: Envisioning future media environments* (pp. 9-15). ACM.

Dewey, J., 1966. Democracy and education (1916). Jo Ann Boydston (ed.). *The Middle Works of John Dewey*, *9*, pp.1899-1924.

Dezuanni, M., 2015. The building blocks of digital media literacy: socio-material participation and the production of media knowledge. *Journal of Curriculum Studies*, *47*, 416-439.

Dezuanni, M., 2018. *Minecraft* and children's digital making: Implications for media literacy education. *Learning, Media and technology*, *43*(3), pp.236-249.

Dezuanni, M., O'Mara, J. & Beavis, C., 2015. 'Redstone is like electricity': Children's performative representations in and around *Minecraft*. *E-learning and Digital Media*, *12*, 147-163.

Dillon, J., 2008. A review of the research on practical work in school science. *King's College, London*, 1-9.

Dockett, S., Perry, B. and Kearney, E., 2013. Promoting children's informed assent in research participation. *International Journal of Qualitative Studies in Education, 26*(7), pp. 802-828.

Doherty, P., 2002. Developing collaborative research methodology: mapping the context of student learning by developing school-based research hypotheses. *Pedagogy, Culture & Society, 10*(2), pp. 223-238.

Duffy, G. & Elwood, J., 2013. The perspectives of 'disengaged' students in the 14–19 phase on motivations and barriers to learning within the contexts of institutions and classrooms. *London Review of Education*, *11*, 112-126.

Duncan, S., 2014. Does 'gamification' disrupt enough? *Field Guide: a media commons project*. Available at: http://mediacommons.org/fieldguide/question/how-does-gamification-affect-learning/response/gamification-and-learning-environments-desig [Last accessed 3/08/20]

Duncan S.C., 2016. "Games with learning": adpositions and the lusory attitude. *On the Horizon, 24*(3), pp. 246-256.

Dwyer, S. C. & Buckle, J. L., 2009. The space between: On being an insider-outsider in qualitative research. *International Journal of Qualitative Methods*, *8*, 54-63.

Edwards, D., 1997. Structure and function in the analysis of everyday narratives. *Journal of Narrative and Life History*, *7*, 139-146.

Ellison, T. L. and Evans, J. N., 2016. "*Minecraft*," Teachers, Parents, and Learning: What They Need to Know and Understand. *School Community Journal,* 26(2), pp. 25-43.

Elwood, J., Hopfenbeck, T. and Baird, J.A., 2017. Predictability in high-stakes examinations: students' perspectives on a perennial assessment dilemma. *Research Papers in Education*, *32*(1), pp.1-17.

Fenwick, T. J., 2011. *Emerging approaches in educational research: tracing the socio-material*. Routledge.

Fenwick, T. and Edwards, R., 2010. *Actor-network theory in education*. Routledge.

Fenwick, T., 2012. Matterings of Knowing and Doing: Sociomaterial Approaches to Understanding Practice. In: HAGER, P., LEE, A. & REICH, A. (eds.) *Practice, Learning and Change: Practice-Theory Perspectives on Professional Learning*. Dordrecht: Springer Netherlands.

Fenwick, T., 2015. Sociomateriality and Learning: a critical approach. *The SAGE Handbook of Learning. London: Sage Publications*, 83-93.

Fenwick, T. and Edwards, R., 2010. *Actor-network theory in education*. Routledge.

Fenwick, T., Edwards, R. and Sawchuk, P., 2015. *Emerging approaches to educational research: Tracing the socio-material*. Routledge.

Fenwick, T. And Nimmo, G.R., 2015. Making visible what matters: Sociomaterial approaches for research and practice in healthcare education. *Researching Medical Education*, pp.67-80.

Finn, J. D. and Zimmer, K. S., 2012. Student engagement: What is it? Why does it matter? *Handbook of research on student engagement*: Springer, pp. 97-131.

Foucault, M., 1975. *Discipline and Punish: The birth of the prison*. *Trans. Alan Sheridan.* New York: Vintage, *1*, p.977.

Fredricks, J. A. & McColskey, W., 2012. The measurement of student engagement: A comparative analysis of various methods and student self-report instruments. *Handbook of research on student engagement*: Springer, pp. 763-782.

Gee, E., Siyahhan, S. & Cirell, A. M., 2017. Video gaming as digital media, play, and family routine: implications for understanding video gaming and learning in family contexts. *Learning, Media and Technology*, *42*, 468-482.

Gee, J. P. & Hayes, E., 2012. *Nurturing affinity spaces and game-based learning*. Cambridge University Press.

Gee, J.P., 2003. What video games have to teach us about learning and literacy. *Computers in Entertainment (CIE)*, *1*(1), pp.20-20.

Gee, J.P., (2004). *Situated Language and Learning: A Critique of Traditional Schooling*. Taylor & Francis Group, 2004. Available at: http://ebookcentral.proquest.com/lib/bishopg/detail.action?docID=200413.[Last accessed 21/04/20]

Geertz, C., 1998. Deep hanging out. *The New York Review of Books*, *45*, 69-72.

Gibb, N., 2017. The evidence in favour of teacher-led instruction, *Address to Education World Forum*, Transcript on DFE website. Available at: www.gov.uk/government/speeches/nick-gibb-the-evidence-in-favour-of-teacher-led-instruction [Last accessed: 18/09/18]

Gibb, N., 2017. Through Testing Times: a review of the educational reform project and its future, *Policy Exchange* website. Available at: https://policyexchange.org.uk/pxevents/a-speech-by-rt-hon-nick-gibb-mp-

through-testing-times-a-review-of-the-educational-reform-project-and-its-future/ [Last accessed: 18/09/18]

Giddings, S., 2007. Dionysiac machines: Videogames and the triumph of the simulacra. *Convergence*, 13, 417-431.

Gourlay, L. 2015. 'Student engagement' and the tyranny of participation. *Teaching in Higher Education*, 20, 402-411.

Gourlay, L., 2017. Student engagement, 'learnification' and the sociomaterial: critical perspectives on higher education policy. *Higher Education Policy*, *30*, 23-34.

Gourlay, L. & Oliver, M., 2013. Beyond 'the social': digital literacies as sociomaterial practice. In *Literacy in the Digital University (pp.* 93-108). Routledge

Gray, C. & Winter, E., 2011. The ethics of participatory research involving young children with special needs. *Researching young children's perspectives* (pp. 46-57). Routledge.

Greenhow, C. & Lewin, C., 2016. Social media and education: reconceptualizing the boundaries of formal and informal learning. *Learning, Media and Technology*, *41*, 6-30.

Hammersley, M., 2018. What is ethnography? Can it survive? Should it? *Ethnography and Education*, *13*(1), pp.1-17.

Hampson, M. Patton, A & Shanks, L., 2017. 10 Ideas for 21st Century Education, *Innovation Unit.* Available at: www.innovationunit.org/wp-content/uploads/2017/04/10-Ideas-for-21st-Century-Education.pdf [Last accessed: 4/06/20]

Hamlyn Foundation, 2012, 'The Engaging School: A Handbook for school leaders', *Innovation Unit*. Available at: www.innovationunit.org/publications/%20the-engaging-school-a-handbook-for-school-leaders%20/ [Last accessed: 4/06/20]

Harcourt, D., Perry, B. & Waller, T., 2011. *Researching young children's perspectives: Debating the ethics and dilemmas of educational research with children*. Taylor & Francis.

Harlen, W. & Deakin Crick, R., 2002. A systematic review of the impact of summative assessment and tests on students' motivation for learning. *EPPI-Centre Review, version 1.1*. Research evidence in education library, 1.

Heath, C. D., McDaniel, T. & Panchanathan, S., 2019 Examining Motivational Game Features for Students With Learning Disabilities or Attention Disorders. *Handbook of Research on Immersive Digital Games in Educational Environments*: IGI Global, pp. 232-259.

Hembre, O. J., 2019. Exploring iPad Integration in Primary Schools: The Interaction of Policy-Initiated Reforms, Availability Assemblages, and Non-Digital Materials. *Journal of Research on Technology in Education*, 1-14.

Hidi, S. & Renninger, K.A., 2006. The four-phase model of interest development. *Educational Psychologist*, *41*(2), pp.111-127.

Hollett, T. and Ehret, C., 2015. "Bean's World": (Mine) Crafting affective atmospheres of gameplay, learning, and care in a children's hospital. *New Media & Society, 17*(11), pp. 1849-1866.

Hopwood N., 2016, *Professional practice and learning: times, spaces, bodies, things.* Dordrecht: Springer; 2016. p. 327.

Hopwood, N., 2018. *When coding doesn't work, or doesn't make sense: Synoptic units in qualitative data analysis*. Available from https://nickhop.wordpress.com/2018/11/23/when-coding-doesnt-work-or-doesnt-make-sense-synoptic-units-in-qualitative-data-analysis [Last accessed: 20/05/20]

Hultin, L., 2019. On becoming a sociomaterial researcher: Exploring epistemological practices grounded in a relational, performative ontology. *Information and Organization*, *29*(2), pp.91-104.

Hung, A. C. Y., 2016. Beyond the player: A user-centered approach to analyzing digital games and players using actor-network theory. *E-Learning and Digital Media*, *13*, 227-243.

Hutchby, I., 2001. Technologies, texts and affordances. *Sociology*, *35*(2), pp.441-456.

Hutchings, M., 2015. Exam Factories: The Impact of Accountability Measures on Children and Young People. *National Union of Teachers*.

Iacovides, I., McAndrew, P., Scanlon, E. & Aczel, J., 2014. The gaming involvement and informal learning framework. *Simulation & Gaming*, *45*, 611-626.

Ito, M., Horst, H., Bittanti, M., Boyd, D., Herr-Stephenson, B., Lange, P. G., Pascoe, C. & Robinson, L. 2008., Living and Learning with New Media: Summary of Findings from the Digital Youth Project. *John D. and Catherine T. MacArthur Foundation.*

Jackson, A. Y. & Mazzei, L. A., 2013. Plugging one text into another: Thinking with theory in qualitative research. *Qualitative Inquiry*, *19*, 261-271.

Jenson, J. and De Castell, S., 2010. Gender, simulation, and gaming: Research review and redirections. *Simulation & Gaming*, *41*(1), pp.51-71.

Jewitt, C. & Jones, K., 2005. Managing time and space in the new English classroom. In *Material Cultures of Schooling: design, technology, objects, routines. Oxford: Symposium Books.*

Jewitt, C., Moss, G. and Cardini, A., 2007. Pace, interactivity and multimodality in teachers' design of texts for interactive whiteboards in the secondary school classroom. *Learning, Media and Technology*, *32*(3), pp.303-317.

Jewitt, C., Bezemer, J., Jones, K.E.N. and Kress, G., 2009. Changing English? The impact of technology and policy on a school subject in the 21st century. *English Teaching: Practice and Critique*, *8*(3), pp.8-20.

Johnston, K., 2018. *(Re) Imagining Possibilities for Youth in Schools: a Rhizomatic Exploration of Youth's Affective Engagements With Literacy* (Doctoral dissertation, Columbia University).

Johri, A., 2011. Sociomaterial bricolage: The creation of location-spanning work practices by global software developers. *Information and Software Technology,* 53(9), pp. 955-968.

Jones, S., Thiel, J. J., Dávila, D., Pittard, E., Woglom, J. F., Zhou, X., Brown, T. and Snow, M., 2016. Childhood geographies and spatial justice: Making sense of place and space-making as political acts in education. *American Educational Research Journal,* 53(4), pp. 1126-1158.

Jordan, B. & Henderson, A., 1995. Interaction analysis: Foundations and practice. *The Journal of the Learning Sciences*, *4*, 39-103.

Juul, J., 2002. The Open and the Closed: Games of Emergence and Games of Progression. In *CGDC Conf*.

Kamstrupp, A.K., 2016. The wow-effect in science teacher education. *Cultural Studies of Science Education*, *11*(4), pp.879-897.

King, E. M., 2015. Designing After-School Learning Using the Massively Multiplayer Online Role-Playing Game. *Theory into Practice*, *54*, 128-135.

Kraftl, P., 2016. Emotional geographies and the study of education spaces. *Methodological Advances in Research on Emotion and Education*. Springer.

Kuhn, T., 1962. The structure of scientific revolutions.

Kupiainen, R., 2013. Dissolving the School Space: young people's media production in and outside of school. *Policy Futures in Education*, *11*, 37-46.

Lai, C, Huang, Y.X & Lam, T., 2020. Teachers' socio-spatial practice in innovative learning environments. *Cambridge Journal of Education*, pp.1-18.

Landri, P., 2013. Mobilising ethnographers investigating technologised learning. *Ethnography and Education*, 8, 239-254.

Lane, C. A., 2018. *Multiliteracies meaning-making: How four boys' video gaming experiences influence their cultural knowledge—Two ethnographic cases.* (Doctoral dissertation, University of Western Ontario]

Latour, B., 2005. *Reassembling the social: An introduction to actor-network-theory*. Oxford University Press.

Lave, J. & Wenger, E., 1998. Legitimate Peripheral Participation in Communities of Practice. In: McCormick, R. & Paechter, C. F. (eds.) *Learning and Knowledge.* London: Open University.

Law, J. & Mol, A., 2001. Situating technoscience: an inquiry into spatialities. *Environment and Planning D: Society and Space*, *19*, 609-621.

Leander, K. M., 2007. You won't be needing your laptops today: Wired bodies in the wireless classroom. *A New Literacies Sampler*, 25-48.

Leander, K.M. and Lovvorn, J.F., 2006. Literacy networks: Following the circulation of texts, bodies, and objects in the schooling and online gaming of one youth. *Cognition and Instruction*, *24*(3), pp.291-340.

Lefebvre, H. and Nicholson-Smith, D., 1991. *The production of space* (Vol. 142). Blackwell: Oxford

Lehain, M., 2017, 'It's time to stop demonising SATS – we need to test 11-year-olds'. *The Telegraph, 8 May*. Available at: https://www.telegraph.co.uk/education/2017/05/08/time-stop-demonising-sats-need-test-11-year-olds/ [Last accessed: 18/09/18]

Leonardi, P.M., 2010. Digital materiality? How artifacts without matter, matter. *First Monday*.

Leonardi, P. M., 2012. Materiality, sociomateriality, and socio-technical systems: what do these terms mean? How are they related? Do we need them. *Materiality and organizing: Social interaction in a technological world*, *25*.

Linderoth, J., 2012. Why gamers don't learn more: An ecological approach to games as learning environments. *Journal of Gaming & Virtual Worlds*, 4, 45-62.

Lombana Bermudez A., 2013. Gamification and Learning Environments: Designing for Engagement and Fun. *Field Guide: a media commons project* Available at: http://mediacommons.org/fieldguide/question/how-does-gamification-affect-learning/response/gamification-and-learning-environments-desig [Last accessed 3/08/20]

Macklem, G. L., 2015. *Boredom in the classroom: Addressing student motivation, self-regulation, and engagement in learning*. Springer.

Macleod, A., Cameron, P., Ajjawi, R., Kits, O. And Tummons, J., 2019. Actor-network theory and ethnography: Sociomaterial approaches to researching medical education. *Perspectives on Medical Education,* 8(3), pp. 177-186.

Mahat, M., Bradbeer, C., Byers, T. and Imms, W., 2018. Innovative Learning Environments and Teacher Change: Defining key concepts. *Technical Report*.

Mansell, W., James, M. & Group, A. R., 2009. Assessment in schools. Fit for purpose? A Commentary by the Teaching and Learning Research Programme. In: *Economic And Social Research Council, T. & Programme*., A. L. R. (eds.). London.

Marcon, N., (2016) *Exploring Minecraft as a pedagogical tool to motivate and enhance girls' literacy practices in the secondary English classroom.* [Doctoral dissertation, Monash University].

Markovits, A.S. and Green, A.I., 2017. *FIFA*, the video game: a major vehicle for soccer's popularization in the United States. *Sport in Society*, *20*(5-6), pp.716-734.

Margaryan, A., Littlejohn, A. & Vojt, G., 2011. Are digital natives a myth or reality? University students' use of digital technologies. *Computers & Education*, *56*, 429-440.

Marples, R., 2010. What is education for? *The Philosophy of Education: An introduction*, 435-446.

Massumi, B., 1988. Translator's foreword and notes. In *A thousand plateaus: Capitalism and schizophrenia*., ix-xix. Bloomsbury Publishing.

Mavoa, J., Carter, M. and Gibbs, M., 2018. Children and Minecraft: A survey of children's digital play. *new media & society*, *20*(9), pp.3283-3303.

McGregor, J., 2003. Making spaces: Teacher workplace topologies. *Pedagogy, Culture and Society*, *11*, 353-377.

McGregor, J., 2004. Spatiality and the place of the material in schools. *Pedagogy, Culture and Society*, *12*, 347-372.

Merchant, G., 2009. Web 2.0, new literacies, and the idea of learning through participation. *English Teaching: Practice and Critique*, 8, 107-122.

Meyer, B., 2014. iPads in Learning: The Web of Change, *ERIC*.

Microsoft, 2016. Minecraft: Education Edition-Home. *Minecraft Education Edition*.

Mitra, S., 2006. *The hole in the wall: Self-organising systems in education*. New York, NY.

Mol, A. & Law, J., 1994. Regions, networks and fluids: anaemia and social topology. *Social Studies of Science*, *24*, 641-671.

Mol, A., 2002. *The body multiple: Ontology in medical practice*. Duke University Press.

Mojang, A.B., 2011. Minecraft. *Mojang AB, Sweden*.

Montreal, U., Tom Clancy's Rainbow Six Siege.

Mueller, B., Raeth, P., Faraj, S., Kautz, K., Robey, D. & Schultze, U., 2012. On the methodological and philosophical challenges of sociomaterial theorizing: an overview of competing conceptualizations.

Mulcahy, D., 2007. Managing spaces:(re) working relations of strategy and spatiality in vocational education and training. *Studies in Continuing Education*, *29*, 143-162.

Mulcahy, D., 2012. Affective assemblages: Body matters in the pedagogic practices of contemporary school classrooms. *Pedagogy, Culture & Society*, 20, 9-27.

Mulcahy, D., Cleveland, B. and Aberton, H., 2015. Learning spaces and pedagogic change: Envisioned, enacted and experienced. *Pedagogy, Culture & Society, 23(4)*, pp.575-595.

Mulcahy, D. & Morrison, C., 2017. Re/assembling 'innovative' learning environments: Affective practice and its politics. *Educational Philosophy and Theory*, *49*, 749-758.

Müller, M. & Schurr, C., 2016. Assemblage thinking and actor-network theory: conjunctions, disjunctions, cross-fertilisations. *Transactions of the Institute of British Geographers*, *41*, 217-229.

Neumann, E., Towers, E., Gerwitz, S. and Maguire, M., 2016. The effects of recent Key Stage 4 curriculum, assessment and accountability reforms on English secondary education. *London: National Union of Teachers and King's College London*.

Nicolini, D., 2009. Articulating practice through the interview to the double. *Management Learning*, 40, 195-212.

Niemimaa, M., 2014. Sociomaterial ethnography: Taking the Matter seriously. *MCIS*, 45.

Norman, D., 2004. Affordances and design. Unpublished article. Available at: http://www.jnd.org/dn.mss/affordances-and-design.html. [Last accessed: 24/05/15]

O'Brien, H. L. & Toms, E. G., 2008. What is user engagement? A conceptual framework for defining user engagement with technology. *Journal of the Association for Information Science and Technology*, *59*, 938-955.

O'Reilly, K., (2008) *Key concepts in ethnography.* Sage.

OFSTED, 2014. Below the radar: low-level disruption in the country's classrooms. Available at: www.ofsted.gov.uk/resources/1410157 [Last accessed: 18/0918]

OECD, 2018. How can we effectively use technology in classrooms?' in Teaching for the Future: Effective Classroom Practices to transform education, OECD Publishing, Paris. Available at: DOI: http://dx.doi.org/10.1787/9789264293243-7-en [Last accessed: 25/01/19]

OFSTED, 2018. What do we understand to be the real substance of education. Available at: www.gov.uk/government/speeches/hmci-commentary-curriculum-and-the -new-education-inspection-framework Last accessed: 18/10/18]

Oliver, M., 2012. Learning with technology as coordinated sociomaterial practice: Digital literacies as a site of praxiological study. *Proceedings of the 8th International Conference on Networked Learning*, 2-4.

O'Sullivan, M., Robb, N., Howell, S., Marshall, K. and Goodman, L., 2017. Designing inclusive learning for twice exceptional students in Minecraft.

Otrel-Cass, K., Andreasen, K. E. & Bang, L., 2016. The standard child. *Activity Theory in Education*. Springer.

Page, D., 2017. The surveillance of teachers and the simulation of teaching. *Journal of Education Policy, 32*, 1-13.

Pahl, K. And Rowsell, J., 2005. *Literacy and Education: Understanding the New Literacy Studies in the Classroom*. London: Paul Chapman Publications.

Papert, S. & Harel, I. 1991. Situating constructionism. *Constructionism, 1-11*

Pedró, F., 2012. Connected minds: Technology and today's learners. *OECD*.

Perez, C.C., 2019. *Invisible women: Exposing data bias in a world designed for men*. Random House.

Philo, C., Parr, H. & Burns, N., 2005. "An oasis for us": 'in-between' spaces of training for people with mental health problems in the Scottish Highlands. *Geoforum*, 36, 778-791.

Pink, S. 2013. *Doing visual ethnography.* Sage. Policy, 30(1), pp.23-34

Postma, D. 2012. Education as sociomaterial critique. *Pedagogy, Culture & Society, 20*, 137-156.

Potts, A., 2004. Deleuze on Viagra (or, what can a 'Viagra-body'do?). *Body & Society*, *10*(1), pp.17-36.

Potts, L. & Jones, D., 2011. Contextualizing Experiences: Tracing the Relationships Between People and Technologies in the Social Web. *Journal of Business & Technical Communication*, 25, 338.

Pring, R., 2013. *The life and death of secondary education for all*. Routledge

Prosser, J., 2007. Visual methods and the visual culture of schools. *Visual Studies*, 22, 13-30.

Rajala, A., Kumpulainen, K., Hilppö, J., Paananen, M. & Lipponen, L., 2016. Connecting learning across school and out-of-school contexts: A review of pedagogical approaches. In *Learning across contexts in the knowledge society*. (pp. 15-35) Brill Sense.

Renninger, K. A., Sansone, C., & Smith, J., 2004. *Love of learning*.

Reschly, A.L. and Christenson, S.L., 2012. Jingle, jangle, and conceptual haziness: Evolution and future directions of the engagement construct. In *Handbook of research on student engagement* (pp. 3-19). Springer, Boston, MA.

Roberts, N. and Hill, R., 2020. House of Commons Library: Briefing Paper Number CBP 07091, 18 February 2020: School inspections in England: Ofsted.

Robson, C., 2002. *Real world research: A resource for social scientists and practitioner-researchers* (Vol. 2). Oxford: Blackwell.

Roehl, T., 2012. Disassembling the classroom – an ethnographic approach to the materiality of education. *Ethnography and Education*, 7, 109-126.

Ross, A., 2009. Disengagement from Education among 14-16-year-olds.

Sánchez, R. A., Cortijo, V. & Javed, U., 2014. Students' perceptions of Facebook for academic purposes. *Computers & Education,* 70**,** 138-149.

Sangster, M., 2007. Reflecting on Pace. *Mathematics Teaching Incorporating Micromath, 204*, pp. 34-36.

Savin-Baden, M. & Major, C. H., 2013. *Qualitative research: The essential guide to theory and practice*. Routledge.

Satwicz, T., 2006. *Technology at play: an ethnographic study of young people's video gaming practices*. [Doctoral Thesis, University of Washington]

Schadler, C., 2019. Enactments of a new materialist ethnography: methodological framework and research processes. *Qualitative Research*, *19*(2), pp.215-230.

Schoenau-Fog, H., 2011. The Player Engagement Process-An Exploration of Continuation Desire in Digital Games. *DiGRA Conference*.

Schön, D.A., 1983. Education for reflection in action: an alternative to the positivist epistemiology of practice. In *The Optimum Utilization of Knowledge: Making Knowledge Serve Human Betterment*. Westview Boulder.

Schott, G. R. and Horrell, K. R., 2000. Girl gamers and their relationship with the gaming culture. *Convergence,* 6(4), pp. 36-53.

Shernoff, D. J., 2013. *The Nature of Engagement in Schools. Optimal Learning Environments to Promote Student Engagement*. Springer.

Shernoff, D.J., Kelly, S., Tonks, S.M., Anderson, B., Cavanagh, R.F., Sinha, S. and Abdi, B., 2016. Student engagement as a function of environmental complexity in high school classrooms. *Learning and Instruction*, *43*, pp.52-60.

Shernoff, D. J. & Csikszentmihalyi, M., 2009. Cultivating engaged learners and optimal learning environments. *Handbook of Positive Psychology in Schools*, 131-145.

Shields, R., 2013. *Spatial questions: Cultural topologies and social spatialization*. Sage.

Smeaton, D., 2014. The *Minecraft* Teacher.

Smith, E. E., 2016. "A real double-edged sword:" Undergraduate perceptions of social media in their learning. *Computers & Education*, 103, 44-58.

Smyth, J., McInerney, P. & Fish, T., 2013. Blurring the boundaries: From relational learning towards a critical pedagogy of engagement for disengaged disadvantaged young people. *Pedagogy, Culture & Society*, 21, 299-320.

Sørensen, E., 2007. The time of materiality. *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research*

Sørensen, E., 2009. *The materiality of learning: Technology and knowledge in educational practice*. Cambridge University Press.

Spielman, A., 2018. Chief Inspector sets out vision for new Education Inspection Framework, OFSTED. Available at: https://www.gov.uk/government/speeches/amanda-spielman-speech-to-the-schools-northeast-summit [Last accessed: 10/12/18]

Sports, E.A., 2001. FIFA 2002.

Sullivan, A.M., Johnston, B., Owens, L. and Conway, R., 2014. Punish them or engage them? Teachers' views of unproductive student behaviours in the classroom. *Australian Journal of Teacher Education*, *39*(6), p.4.

Taylor, T.L., 2002. Living digitally: Embodiment in virtual worlds. In *The social life of avatars* (pp. 40-62). Springer, London.

Taylor, T., 2009. The assemblage of play. *Games and Culture,* 4(4), pp. 331-339.

Thompson, G., & Cook, I., 2015. Becoming-topologies of Education: Deformations, Networks and the Database Effect. *Discourse: Studies in the Cultural Politics of Education* 5 (36): 732–748.

Thomson, P. & Gunter, H., 2011. Inside, outside, upside down: The fluidity of academic researcher 'identity' in working with/in school. *International Journal of Research & Method in Education*, 34, 17-30.

Thomson, P., 2017. Play with your data. [Blog] *Patter*, Available at: <https://patthomson.net/2017/08/17/play-with-your-data/> [Last accessed 24/05/20].

Torrance, H., 2017. Blaming the victim: assessment, examinations, and the responsibilisation of students and teachers in neo-liberal governance. *Discourse: Studies in the Cultural Politics of Education*, 38, 83-96.

Van Osch, W. & Mendelson, O., 2011. A typology of affordances: Untangling sociomaterial interactions through video analysis.

Veale, K., 2015. Affect, responsibility and how modes of engagement shape the experience of videogames.

Walmsley, B., 2018. Deep hanging out in the arts: an anthropological approach to capturing cultural value. *International Journal of Cultural Policy*, 24, 272-291.

Wajcman, J., 2018. The digital architecture of time management. *Science, Technology, & Human Values*, *44*(2), pp.315-337.

Wannarka, R. & Ruhl, K., 2008. Seating arrangements that promote positive academic and behavioural outcomes: A review of empirical research. *Support for Learning,* 23**,** 89-93.

Ward, H., 2018. Direct instruction works, says 50 years of research. TES, 30th July. Available at: https://www.tes.com/news/direct-instruction-works-says-50-years-research [Last accessed: 18/09/18

Wherton, J., Greenhalgh, T., Procter, R., Shaw, S. And Shaw, J., 2019. Wandering as a sociomaterial practice: extending the theorization of GPS tracking in cognitive impairment. *Qualitative Health Research*, *29*(3), pp.328-344.

Whitton, N. & Moseley, A., 2014. Deconstructing engagement: Rethinking involvement in learning. *Simulation & Gaming*, 45, 433-449.

Whyte, J., 2006. Research with children with disabilities. *National Disability Authority*. *Retrieved July,17, 2009*.

Williamson, B., 2013. *The future of the curriculum: School knowledge in the digital age*. MIT Press.

Willms, J. D., 2003. Student engagement at school: A sense of belonging and participation: Results from PISA 2000. *Publications de l'OCDE*.

Wybron, I. & Paget, A., 2016. *Pupil power*.

Young, M. & Lambert, D., 2014. *Knowledge and the Future School: curriculum and social justice*. London. Bloomsbury.

Zagal & Mateas, J.P. & Mateas, M., 2015. Analyzing time in videogames. In *Game Research Methods* (pp. 37-55).

Zürcher, R., 2015. A sociomaterial model of the teaching-learning continuum. *European Journal for Research on the Education and Learning of Adults*, 6, 73-90.

Appendices

Appendix 1 School Access Information Sheet

Contact details: Noreen Dunnett
Email:

Videogames, Engagement and Learning – Research Project

Summary

The research is concerned with why young people are becoming increasingly disengaged with formal learning. It will explore the divide between formal and informal learning through an examination of how young people learn in videogame environments. I am interested in the personal perspectives of a group of learners, some of whom could be disengaged from school and formal learning, but who are keen players of videogames. I would like to use the group of students involved in the lunch-time Minecraft Club run by Mr

I want to explore how these young people construct knowledge within a digital gaming ecology. I will compare their perspectives of learning in game environments to learning experiences within the formal context of the classroom in order to throw light on the nature of the participatory culture which is a growing part of young people's cultural reality. My aim is to add to understanding of how new technology such as digital gaming can contribute to educational engagement and lifelong learning.

Requirements – participants and research schedule

- Members Minecraft club.
- 2-3 teachers – and the Head of English, other English teachers
- Research to take place between Jan 2017 – May 2017, on Wed lunchtimes and other times to be arranged with students and teachers.
- Some data about student achievement and progress will be required but will be kept confidential and used only to select participants.
- Will parental consent be required for students to take part during school day?

Schedule for Research

Late January/early Feb

- Consent forms and information sheet distributed to students in Minecraft Club (see attached copy of form). **Completed by 1st Feb**
- Online survey distributed and completed by students.
- Consent forms from teachers returned to researcher by **Friday 11th Feb.**
- Informal chats with students during Minecraft club begin.

Early March

- Teacher interviews with researcher – 30 mins.
- Teacher recommendations for students who will be main research participants – only 5-6 needed.
- More in-depth, individual discussions with main participants – during lunch.

April/May

- Lesson observations of students in main participant group
- Possible work in English – writing blogs/stories etc about gameplay.

Appendix 2 Extracurricular activity timetable

What's Happening on Wednesdays

TIME	NAME OF ACTIVITY	VENUE	YEAR GROUP	OPEN TO?	STAFF
Break Time	C314 Break Club	C314	Y7, Y8, Y9	Invite Only	
Lunchtime	Badminton	Sports Hall	All Year Groups	Open to all	
Lunchtime	Creative Writing Club	K118	Y7, Y8, Y9, Y10, Y11	Open to all	
Lunchtime	Games Club	Library	All Year Groups	Open to all	
Lunchtime	GCSE Art Study Support	W307	Y10, Y11	Open to all	
Lunchtime	GCSE Graphic Products	W104	Y11	Open to all	
Lunchtime	KS4 Computer Access Club	C305	Y10, Y11	Open to all	
Lunchtime	Lunch club	C314	All Year Groups	Invite only	
Lunchtime	Minecraft Club	C311	Y7, Y8, Y9, Y10	Open to all	
Lunchtime	Production Singing	K214	All Year Groups	Invite only	
Lunchtime	Table Tennis club	GYM 2	All Year Groups	Open to all	
Lunchtime	Y10/11 ICT Coursework Club	P304	Y10, Y11	Open to all	
Lunchtime	Y11 Travel and Tourism Study Support	P104	Y10, Y11	Open to all	
After school	Basketball Training	GYM 1	All Year Groups	Open to all	
After school	BTEC Music Coursework Catch Up	K214	Y10, Y11	Open to all	
After school	Btec Music Study Support	K209	Y10, Y11	Open to all	
After school	Computer Science Programming Support	C311	Y10, Y11	Open to all	
After school	Futsal - Y7 + Y8	Astro Turf	Y7, Y8	Open to all	
After school	Futsal - Y9 + Y10	Astro Turf	Y9, Y10	Open to all	
After school	Gardening Club	Kepple Greenhouse	All Year Groups	Open to all	
After school	Gardening Club	Kepple Greenhouse	All Year Groups	Open to all	
After school	GCSE Art Study Support	W302	Y10, Y11	Open to all	
After school	GCSE Composers Forum/Listening Practice	K214	Y10, Y11	Open to all	
After school	GCSE Drama Study Support	K223	Y10, Y11	Open to all	
After school	GCSE Geography Study Support	All Geography Rooms	Y10, Y11	Open to all	
After school	GCSE Graphic Products	W104	Y11	Open to all	
After school	GCSE History Study Support	P302	Y10, Y11	Open to all	
After school	GCSE ICT Study Support	C305	Y10, Y11	Open to all	
After school	GCSE Music Study Support	K124	Y10, Y11	Open to all	
After school	KS4 Business Studies Study Support	P104	Y10, Y11	Open to all	
After school	KS4 Business Studies Study Support	P104	Y11	Open to all	
After school	KS4 Computer Access Club	C305	Y10, Y11	Open to all	
After school	KS4 Health & Social Care Study Support	C312	Y10, Y11	Open to all	
After school	Maths revision	P206	Y10, Y11	Open to all	
After school	Netball Y8 -Y10	Sports Hall	Y8, Y9, Y10	Girls only	
After school	Netball Y8 -Y10	Sports Hall	Y8, Y9, Y10	Girls only	
After school	U12s Girls Football	GYM 2	Y7	Girls only	
After school	We Will Rock You Rehearsals	K223	Y8, Y9, Y10, Y11	Open to all	
After school	Y11 BTEC Sport Intervention	S112	Y10	Boys only	
After school	Y11 PE Coursework Catch Up	S112	Y10	Boys only	
After school	Y7 Boys Football B Team Training	Fields	Y7	Boys only	
After school	Y7 Football	Fields	Y7	Boys only	
After school	Y9 Football	Fields	Y9	Boys only	

WE'RE OPENING THE DOOR, YOU ENTER BY YOURSELF!

*** BEFORE ATTENDING AN ACTIVITY, PLEASE SEE THE MEMBER OF STAFF TO ENSURE THAT IT IS RUNNING AND IF NECESSARY TO OBTAIN A PASS/INVITE***

Please make sure you tell your parents/carers if you are attending a club

Appendix 3 Participant survey

Videogames, learning and engagement

Page 1: Introduction

I am a research student at the University of Edinburgh and I also love playing videogames. I am trying to find out what makes learning engaging and interesting for young people like you. I want to find out how you learn in multiplayer video games and compare that to how you feel about learning in the classroom.

This survey is going to help me find out how you feel about learning in school, how you spend your time outside school and lots about your game playing habits so that I can understand what interests and engages you.

Appendix 4 Teacher Consent Form

LEARNING IN VIDEOGAME ENVIRONMENTS
TEACHER INFORMATION SHEET

PROJECT TITLE
Engagement and learning: videogames, learners and environments.

INVITATION
You are being asked to take part in a research study which will look at how students learn and are motivated to learn in multiplayer videogames compared to learning at school.

My name is Noreen Dunnett. I am a former English teacher and I am currently tutoring on the MSc in Digital Education and studying part-time for a PhD at the University of Edinburgh. This project has been approved by the University of Edinburgh Research Ethics Committee.

WHAT WILL HAPPEN
You will be asked to take part in an interview regarding your views about engagement and disengagement from learning and to administer a short, online survey[1] for students prior to my individual chats and interviews with them

After the short interview, you and other teachers in the study (if there are any) will be asked about your perceptions of the levels of engagement which each student has in their English class and in their other lessons in school. Engagement criteria will be drawn from your interview and from the students' replies to the online survey (see above [1])

The students chosen from English classes for the study will produce various types of writing about Minecraft which I will use as data in my research. I may want to observe some lessons and chat to students about their work.

I will make audio recordings of most of my chats and interviews with students and sections of some lessons (with your agreement). I will also keep copies of students' recordings of their interview with Masters students and the recordings of the responses and this will be used as data in my study report. All participants will be anonymous. Only I will have access to these recording, they will be stored securely until the submission of my final report and then destroyed.

PARTICIPANTS' RIGHTS
You can decide that you should stop being a part of the research study at any time without explanation.

When taking part in an interview or having me present in your classroom, you have the right to stop or leave the interview at any point or ask me to leave your classroom. You have the right to have your questions answered about the way things happen and are organised. If you have any questions as a result of reading this information sheet, you should ask the researcher before the study begins.

BENEFITS AND RISKS

Revised by PREC Convenor 15 October 2009

I have the relevant DBS certificate to work with children and should your students disclose anything in an interview or a game play recording which is a safeguarding issue I will ensure that I pass on the matter immediately to the safeguarding lead, in line with your school's safeguarding policy.

We hope the research will help people, particularly teachers, to better understand what it is that motivates and engages young people in learning. By looking at learning in videogames and the ability to consult others, refer to help guides and watch 'game play' videos we hope to understand how learning in school might become more engaging for students, particularly those who have already 'disengaged' to some extent.

COST, REIMBURSEMENT AND COMPENSATION
Taking part in this study is voluntary – you can decide whether you want to do so or not.

CONFIDENTIALITY/ANONYMITY
What you tell the researcher in interviews will not be linked to your name, address or email address, in other words, what you say about students will be anonymous. The information will be used only as part of my thesis in submission for a PhD at the University of Edinburgh.

FOR FURTHER INFORMATION
I, or my supervisor, Professor Sian Bayne, Moray House School of Education, University of Edinburgh, will be glad to answer your questions about this study at any time. You may contact me by telephone at or home email or Professor Bayne at 0131 651 6337 or work email sian.bayne@ed.ac.uk

If you want to find out about the final results of this study, you can request details by emailing me at

[1] Online survey link: https://edinburgh.onlinesurveys.ac.uk/videogames-learning-and-engagement-copy
Password: Videogame

Revised by PREC Convenor 15 October 2009

INFORMED CONSENT FORM

PROJECT TITLE Engagement and learning: videogames, learners and environments.

PROJECT SUMMARY
The intention of this research is to investigate the links between children's motivation to learn in videogame environments and the online gaming communities which surround these games and to compare this learning environment with the more formal learning environment of the classroom.

The main research participants will be students at school who are either members of the Minecraft club or part of a Y7 English Intervention class and regularly play multiplayer videogames. Some of those participants may be less engaged with learning in a school environment. Students will be chosen through interviews with teachers, who will recommend students they feel fit the description above, and partly by the researcher.

Data will be gathered in several ways – from informal chats and interviews with students and teachers, students' writing in English classes and through observation of learning situations in classrooms, from the use of recorded game play (YouTube) and chat and from the collection of online information on discussion boards, 'cheat' websites and written 'walk through' documents.

By signing below, you are agreeing that: (1) you have read and understood the Participant Information Sheet, (2) questions about your participation in this study have been answered satisfactorily, (3) you are aware of the potential risks (if any), and (4) you are taking part in this research study voluntarily (without coercion).

Participant's Name (Printed)* Participant's signature*

Date

Name of person obtaining consent (Printed) Signature of person obtaining consent

**Participants wishing to preserve some degree of anonymity may use their initials (from the British Psychological Society Guidelines for Minimal Standards of Ethical Approval in Psychological Research)*

Appendix 5 Student consent form/information booklet

INFORMED CONSENT FORM

My research is trying to find out what makes learning engaging and fun for young people by exploring how they learn in multiplayer video games such as Minecraft and comparing that to learning in the classroom.

I have chosen to talk to you and other students in the Minecraft club so that I can learn about your experiences of learning to play games compared to learning in school. Although I will use what you tell me when I write up my research your name will not be used, nor the name of the school.

I will collect the information I need through informal chats and interviews with you. Most of these chats will be at Minecraft club and some at other times – I will record these chats, with your permission.

By signing below, you are agreeing that:

- you have read and understood the Information Leaflet.
- you have had all your questions about taking part in this study answered satisfactorily and you are aware of possible risks (if any)
- you are taking part in this research study voluntarily (without being forced to take part).

_____ _____

Your Name (Printed)* Your signature*

Date_____

_____

Name of person obtaining consent (Printed) Signature

**If you wish to stay anonymous (not give your name) you may use your initials (from the British Psychological Society Guidelines for Minimal Standards of Ethical Approval in Psychological Research)*

Learning in Videogames Project

Is there a reward for taking part?

You can decide whether you want to take part in this research or not, but unfortunately there is **no reward** for taking part except the fun of talking about and sharing your experiences of videogames with someone who also loves and enjoys playing them!!

Who will know I am taking part?

Your teacher, your parents and the other students taking part in the research will know about you taking part in this research. However your teachers will not be told specific things that you have said to me although they might be told some general things about what the research has found out, so that they can use that information to plan interesting lessons in the future. I will not discuss what you say to me with your parents either. Remember, what you say will not affect how well you do in school.

What you tell me in interviews will not be linked to your name, address or email address, in other words, what you say will be anonymous. If you tell me anything which makes me worried about your personal safety I may have to pass that information to others, however. The information you give me will be used as part of my report for the qualification I am working towards at the University of Edinburgh.

Invitation

Can you help me with some research about your experiences of learning in multiplayer video games such as Minecraft and how it compares to the way you learn at school?

My name is Noreen Dunnett. I am a PhD student at the University of Edinburgh in Scotland. If you agree to talk to me I will use what you tell me to write a report which may help teachers to find new and interesting ways to learn in school.

If you agree to help I will ask you to sign a form to show that you have officially agreed to be part of this project. Before you do that, please read through the rest of this leaflet to find out what you are being asked to do.

Appendix 6 Parent Information and Consent Sheets

Appendix 6 Parent Information and Consent Form

LEARNING IN VIDEOGAMES RESEARCH - INFORMATION SHEET (PARENTS)

PROJECT TITLE

Playing to learn: videogames, learners and environments.

INVITATION

I would like to invite your child to take part in a research study which will look at how they and other students learn and engage with videogames compared to their engagement with learning at school.

My name is Noreen Dunnett. I am studying for a doctorate at the University of Edinburgh and this research on videogames and learning will be submitted for that degree. This project has been approved by the University of Edinburgh, School of Education Research Ethics Committee.

WHAT WILL HAPPEN

For my research study, your child, as part of the lunchtime Minecraft Club, has completed a short, online survey and has been interviewed about the videogames they enjoy playing, their motivation for playing and how they learn to succeed or win the game. They have also been asked to compare their learning experiences in videogames with how they learn in school. I now plan to record, or ask your child to record, some of their online gaming sessions and chats, take photos of their gaming equipment and location at home and share these with me. I also plan to observe your child in lessons over the course of one day in school.

Any recordings your child makes of their game play will be transcribed and parts may be quoted in my research but your child's name will not be disclosed. Photos of gaming equipment will be made unidentifiable. Conversations which take place will remain private between myself and your child, but extracts may be quoted and anonymised in my work. All transcriptions or recordings (audio or video) will be stored securely and destroyed after the research has been completed.

YOUR CHILD'S RIGHTS

You or your child can decide that they should stop being a part of the research study at any time without explanation.

When taking part in an interview or chat your child has the right to stop or leave the interview or decline to chat with me at any point. Taking part in this study will not have any effect on your child's progress in class. You and your child have the right to have your questions answered about the way things happen and are organised. If you have any questions as a result of reading this information sheet, you should ask the researcher before the study begins.

Appendix 6 Parent Information and Consent Form

BENEFITS AND RISKS

There should be no risk to your child in being involved with this study. I have a relevant DBS certificate, which clears me to work with children in both England and Scotland. Should your child disclose anything in an interview or in any writing tasks they undertake, which is a safeguarding issue, I will ensure that I pass on the matter immediately, to the safeguarding lead at [redacted] R****** W*******, in line with the school's safeguarding policy.

We hope the research will help people to better understand what it is that motivates young people to learn. By looking at learning in videogames and the ability to consult others, refer to help guides and watch 'game play' videos we hope to understand how learning in school might become more engaging.

COSTS OF TAKING PART/REWARDS

There is no cost to you or your child in taking part in this study. It is voluntary – you and your child can decide whether to take part or not.

CONFIDENTIALITY/ANONYMITY

What your child tells me in interviews or writing tasks will not be linked to their name, address or email address, in other words, what they say will be anonymous. The information will be used only as part of my thesis which I am writing for a doctorate degree at the University of Edinburgh.

FOR FURTHER INFORMATION

I, or my supervisor, Professor Sian Bayne, Moray House School of Education, University of Edinburgh, will be glad to answer your questions about this study at any time. You may contact me by telephone at [redacted] or home email [redacted] or Professor Bayne at 0131 651 6337 or work email sian.bayne@ed.ac.uk

If you want to find out about the final results of this study, you can request details by emailing me at [redacted]

Appendix 6 Parent Information and Consent Sheets (continued)

Appendix 6 Parent Information and Consent Form

INFORMED CONSENT FORM

PROJECT TITLE Playing to learn: videogames, learners and environments.

PROJECT SUMMARY

The intention of this research is to investigate the nature of engagement in learning by comparing learning in videogames to learning in school. I am interested in the activities, social networks and technology which affects children's motivation to learn and how they support this learning process.

The research participants will be members of the lunchtime Minecraft Club at E********** School who will be taking part in voluntary sessions on Wednesdays.

Information will be gathered in the following ways: through recorded audio interviews and chats with students and teachers; through observation in classrooms and possibly the video recording of your child's game play during club sessions and still photos of home gaming environments. Any video or audio recordings and photos (to which only I would have access) involving your child would be stored securely for reference purposes until the end of my research after which they would be destroyed. No individual or school will be named in the reporting of the study.

By signing below, you are agreeing that:

- you have read and understood the accompanying Information Sheet
- questions about your child's participation in this study have been answered satisfactorily
- you are aware of the potential risks (if any)
- your child is taking part in this research study voluntarily (without coercion).

Please **detach** this consent form, **sign it** and return to School **either** by post to: **OR** ask your child to hand in the form to I , the organiser of the Minecraft Club or myself (Noreen Dunnett) during club sessions.

_____ _____

Name of Parent (Printed)* Parent's signature

Date_____

_____ _____

Name of person obtaining consent (Printed) Signature of person obtaining consent

**Participants wishing to preserve some degree of anonymity may use their initials (from the British Psychological Society Guidelines for Minimal Standards of Ethical Approval in Psychological Research)*

Appendix 7 English Intervention Minecraft Booklet

Appendix 2 English Intervention Booklet

Learning to play Minecraft

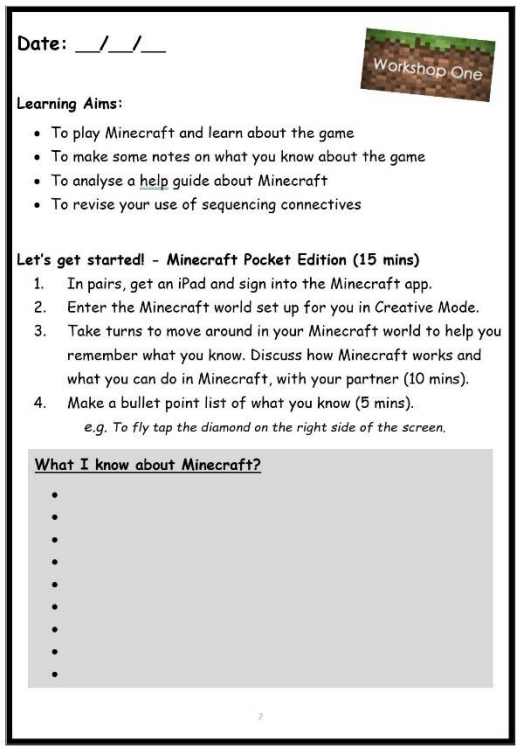
About the project:

This is an exciting opportunity to pass on what you know about Minecraft to a group of teachers who want to use this game to help students learn. You've been selected by your English teacher because they believe you've got what it takes to be part of a project like this and that you deserve to have your work displayed…

Key to success:
Commitment, enthusiasm and creativity!

Name: ……

Teacher: ……



Date: __/__/__

Workshop One

Learning Aims:

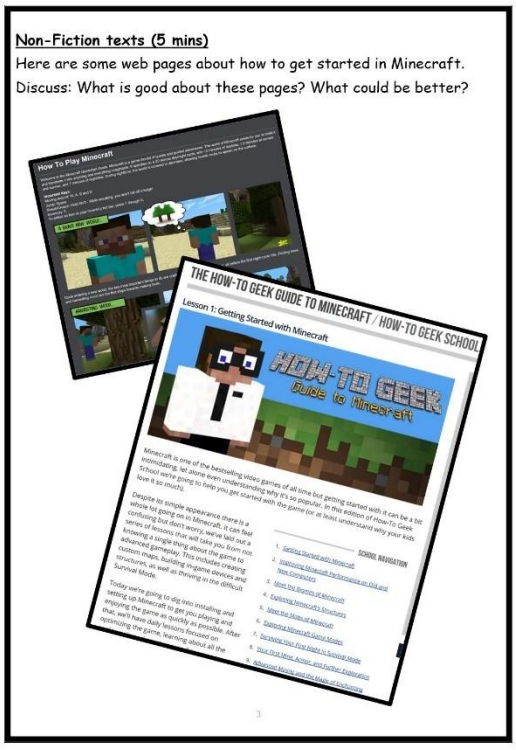
- To play Minecraft and learn about the game
- To make some notes on what you know about the game
- To analyse a help guide about Minecraft
- To revise your use of sequencing connectives

Let's get started! - Minecraft Pocket Edition (15 mins)

1. In pairs, get an iPad and sign into the Minecraft app.
2. Enter the Minecraft world set up for you in Creative Mode.
3. Take turns to move around in your Minecraft world to help you remember what you know. Discuss how Minecraft works and what you can do in Minecraft, with your partner (10 mins).
4. Make a bullet point list of what you know (5 mins).

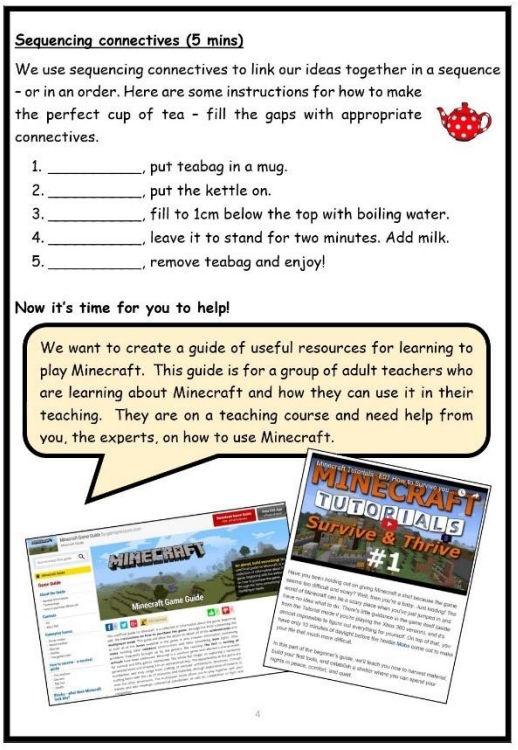
e.g. To fly tap the diamond on the right side of the screen.

What I know about Minecraft?



Non-Fiction texts (5 mins)

Here are some web pages about how to get started in Minecraft.
Discuss: What is good about these pages? What could be better?



Sequencing connectives (5 mins)

We use sequencing connectives to link our ideas together in a sequence - or in an order. Here are some instructions for how to make the perfect cup of tea - fill the gaps with appropriate connectives.

1. _____, put teabag in a mug.
2. _____, put the kettle on.
3. _____, fill to 1cm below the top with boiling water.
4. _____, leave it to stand for two minutes. Add milk.
5. _____, remove teabag and enjoy!

Now it's time for you to help!

We want to create a guide of useful resources for learning to play Minecraft. This guide is for a group of adult teachers who are learning about Minecraft and how they can use it in their teaching. They are on a teaching course and need help from you, the experts, on how to use Minecraft.

Appendix 7 (continued)

Writing a Blog Entry

Your task is to create a blog entry giving information about the best ways to learn about Minecraft and what you can do in the Minecraft world – this might include YouTube videos and links to good websites, books or social media sites.

Use your bullet points to help and include sequencing connectives.

How to Join (15 mins):

1. In Safari, go to: http://goo.gl/ANv7qq
2. *Click 'New Post' on the right corner:*

3. Enter your title: *e.g. How to play Minecraft by Joe and Annie*
4. Write your blog post. Make sure you click publish when you're done!

Reflection (5 mins)

We're going to send your blog entry to the adults on the education course and they will write back to you to tell you if they found it helpful and whether you could improve it to help them even more.

- WWW: One thing I have done well is…
- EBI: I could improve my web page/blog by…
- DIRT: To do this, my next step should be…

- Ask 3 people that you know what their favourite game is and how they learnt to play it.
- Write their answers down or record them on your phone and bring them to the next workshop.

5

Date: __/__/__

Learning Aims:

- To discuss games people play and how they learn to play
- To revise different sentence openers
- To analyse a piece of fiction about Minecraft
- To create a fiction text of our own based on Minecraft

Sentence Openers

One easy way to make your writing interesting is to vary the ways in which you open each sentence. An easy mnemonic to help you to remember is ISPACED:

- I – -Ing words – e.g., Running, the Skeleton disappeared.
- S – Simile – e.g., Like a ripple on water the rumour travelled.
- P – Preposition – e.g., In the mist a shadow formed.
- A – Adverbs – e.g., Viciously, the Creeper snarled.
- C – Connectives – e.g., Meanwhile, the storm raged on.
- E – Ed words – e.g., Shocked, I looked away.
- D – Dialogue – e.g., "No way!" she shouted.

My miniature story (20 mins):

Using this image, write a mini-story no more than 10 sentences long, including ALL the different parts of ISPACED.

7

Designing your Own Space (15 mins)

1. In pairs, get an iPad and sign into the Minecraft app.
2. Enter the Minecraft world set up for you in Creative Mode.
3. Take turns to create a building for you to live in. You can use whichever materials you like. There's only one thing to be aware of – you've only got 15 minutes to make it!

Planning your Descriptive Writing (10 mins)

In the next session, your task is to create a description of something you have built in Minecraft and the environment around it. Imagine you are standing next to your Minecraft building and focus on what you can see, hear, feel, smell and taste.

What can you see?	What can you smell?	What can you feel?	What can you hear?	What can you taste?

8

Appendix 7 (continued)

Date: __/__/__

Learning Aims:

- To consider when we use paragraphs
- To plan and write your description
- To review your best paragraphs and share them on the blog

Your task today is to write a description of something you have built in Minecraft and the environment around it.

Imagine you are standing next to your Minecraft building and focus on what you can see, hear, feel, smell and taste.

Tip Top paragraphing

- Changing paragraph signals to your reader that something else has changed; it breaks your writing into sections.

9

Plan your paragraphs (5 mins)

Paragraph 1: The Outside

- Sequencing connective: .....
- I will talk about: .....

Paragraph 2: Entering your Building

- Sequencing connective: .....
- I will talk about: .....

Paragraph 3: Your Favourite Part

- Sequencing connective: .....
- I will talk about: .....

Write your description! (15 mins)

Success Criteria

- *Use the senses to guide you – look back at the last session.*
- *Vary your sentence openers.*
- *Include sequencing connectives.*

10

Date: __/__/__

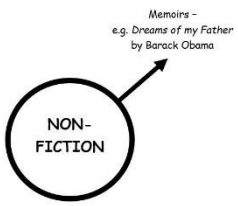
Learning Aims:

- To revise our knowledge of non-fiction texts
- To explore a non-fiction text.
- To prepare for a professional, online interview.

What is Non-Fiction? (10 mins)

Non-fiction is prose writing that is informative or factual rather than fictional. Create a mind-map of all the non-fiction texts you've ever experienced.

Challenge: can you give specific examples?



13

Non-fiction: Let's read! (10 mins)

Interview with Notch (a.k.a Markus Persson, creator of Minecraft)

NOTCH: My name is Markus Persson and I've created Minecraft, a game that has received quite a lot of publicity in the Swedish press lately. It has sold quite a lot as well.

INTERVIEWER: That's an under-statement. How did you begin to take an interest in programming?

NOTCH: Well, it started when I was seven and moved from Edsbyn to Stockholm. My father bought a Commodore and we started subscribing to a Swedish computer magazine that published code listings. Through making mistakes when I was entering the code I realized that you could change stuff in the programs so I started playing around with that. That's how I discovered programming. From that point on I'm pretty much self-taught.

INTERVIEWER: Can you recall the first game you made?

NOTCH: It was probably a year after I started coding, I created a very simple text adventure you had to enter the correct phrase to get to the next frame - failure to do so would kill you or send you off a cliff or something.

INTERVIEWER: What was the game called?

NOTCH: I don't think it had a name. I know there were Indians in it.

INTERVIEWER: I see, so I guess we'll never get a hold of it?

NOTCH: Nah, I didn't know how to save stuff back then so it was a transient art form.

INTERVIEWER: What inspired you to create Minecraft?

NOTCH: I wanted to make a game that I figured would take about six months to a year. Just a smaller project to if it was possible to make money as a solo developer. The original plan was to make a game that was a hybrid between Dwarf Fortress and Rollercoaster Tycoon - elements like gathering resources, chopping wood and building houses etc. When I started playing around with the first-person view Minecraft started taking form. It took about a week to form the idea.

14

Appendix 7 (continued)

Think Deep (10 mins)

1. What do you think the best question is in this interview and why?

2. What could the interviewer have done to get Notch to say more?

3. What's the difference between an open question and a closed question?

4. What do you notice about the structure of this interview?

Preparing for Interviews (10 mins)

Next week we will be inviting students at the University of Edinburgh to be interviewed about the best ways to learn about Minecraft and their opinions about using Minecraft for learning in the classroom.

Your task today is to come up with 2 great questions to ask.

BEWARE: You'll need to make sure nobody else in the group is going to ask the same question as you.

15

My First Question:

What might they say in response?

What follow up questions might I want to ask?

My Second Question:

What might they say in response?

What follow up questions might I want to ask?

16

Date: __/__/__

Learning Aims:

- **To be polite and helpful interviewers.**
- **To conduct a professional, online interview.**
- **To reflect on our experiences so far.**

Be the best that you can be to make sure our interviewees have a great time! Remember that adults are also interested in games such as Minecraft and this is an amazing opportunity for you to hear what they think and find out how to make learning more fun.

Work as a group to come up with three rules for presenting [redacted] School well (10 mins)

1. .....
.....

2. .....
.....

3. .....
.....

It's time to conduct our interview!

17

Reflection (10 mins)

1. How do you feel about the *Learning in Minecraft* project?

2. What have you enjoyed so far?

3. What have you not enjoyed so much?

4. What do you think would make the project even better?

5. What have you learned so far?

6. What do you hope to learn in the future, because of this project?

18

Appendix 7 (continued)

Date: __/__/__

Learning Aims:

- **To revise interview structure.**
- **To write up our professional interview.**

Quick Spelling Test (15 mins)

Your teacher is going to come up with a list of tricky connectives. It's up to you to spell them correctly! Let's see how far we get:

1. 5.
2. 6.
3. 7.
4. 8.

Success Criteria (5 mins)

Let's create success criteria for our interview together. Think of all the things we've thought about during this project…

19

Write your interview up! (15 mins)

If you can't quite remember the answers you got to your questions last week – don't worry! You can make some of it up. ☺

20

Video Reflection (10 mins)

How to record:

1. Launch the Camera app from the Home screen of your iPad.
2. Swipe left to right across the bottom to switch from Photo to Video.
3. Tap the Record button to start your video.
4. Tap the Stop button to end your video.

Use your iPads to record your reflection on this topic.
Ask your partner these questions and record their responses!

- What went well? What are you most proud of on this unit?
  One thing I have done well is…
- What could be done even better?
  I could improve use of structure by including…
- How are you going to improve your English lessons from now on?
  I am going to try and…

21

Date: __/__/__

Learning Aims:

- **To revise all of our learning!**
- **To write up a persuasive speech.**

Today we are working on creating a persuasive speech to use on our Senior Leadership Team to persuade them to allow teachers to use Minecraft for learning projects in the classroom.

Think of all the ways in which you learn things in Minecraft and about Minecraft – mention these in your speech and explain why these ways may be more engaging than normal classroom learning. This means that everything we've learned is going to be incredibly important!

Varied Sentence Openers:

Use your imagination to finish off these sentences!

I believe that _____.

There is evidence that _____.

It is in our interests that _____.

On one hand, _____.

In contrast, _____.

22

Appendix 7 (continued)

It's time to write a persuasive speech to your class! Don't forget – our purpose is to get SLT to allow teachers to use Minecraft for learning in the classroom. Remember everything we've learned!

23

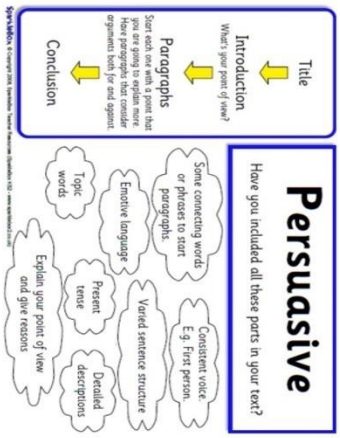
Record your letter!

How to record:

5. Launch the Camera app from the Home screen of your iPad.
6. Swipe left to right across the bottom to switch from Photo to Video.
7. Tap the Record button to start your video.
8. Tap the Stop button to end your video.

Persuasive Speech Self-Reflection:

Tick off where you've met the criteria below! Let's share.



24

Appendix 8 Alternative Minecraft Booklet

Alternative English Intervention Minecraft Lessons

Learning outcomes

To learn about effective instruction and information giving and be able to inform or instruct in written, audio or video form.

To select details appropriately and edit a piece of writing for an audience – e.g blog entries for adults or peers – learn how to respond effectively and integrate feedback given

To write an effective piece of descriptive writing

Sub-goals

Using connectives appropriately

Question types – open and closed

Suggested Structure for Minecraft Intervention

Create a scenario – specific time period, situation

Ask students to take on roles and build the initial village – then activities which revolve around expanding the village, exploring the environment, making sure all needs are met.

Ensure a balance between experiencing the Minecraft environment hands-on, talking and writing.

Build in grammar work, different types of sentences, paragraphing, writing for audience on blog, handling feedback etc.

Technical set up – Minecraft PE on iPads

EACH TEACHER CREATES ONE WORLD AND NAMES IT – all students in that teacher's group will work in this world – locally – they will be invited to play by teacher.

SUGGESTED SAMPLE SCENARIO

There has been a serious epidemic which has killed off most of the population in the UK – a group of people escape a city and set up a new habitat in a remote area of countryside. The people in the group include:

A farmer
A librarian
A soldier
A community leader
A group of teenagers
A paramedic
A married couple with two small children

LESSON 1

Speaking and listening

3.1 Developing and adapting discussion skills and strategies in formal and informal contexts

- make clear and relevant contributions to group discussion
- help discussions succeed by acknowledging and responding to the contributions of others

3.2 Taking roles in group discussion

- contribute to discussions in different ways such as promoting, opposing, exploring and questioning

[Have Minecraft world projected on white board from iPad using Airserver software which is installed on classroom PC]

Explain the scenario and roles to the students – see above. Allocate roles to students.

CLASS or SMALL GROUP DISCUSSION (15-20 mins)

1. How do we choose a good site for the new village – what do we need in the environment to ensure safety and survival of the whole group?

   (Fly around the Minecraft world on board and look at different areas – snowy, desert, near rivers etc. If teacher unsure about this, have a confident student do it).

2. What initial buildings do we need to ensure the survival of the group? Bear in mind the different people in the group e.g farmer, family, teenagers etc. Each student to argue in their allocated role. Make a list.

3. What do the buildings need to be made of and why?
   (open inventory in Minecraft world, on board, and discuss the different building materials)

Appendix 8 Alternative Minecraft Booklet (continued)

4. Mark the area where you have decided to build - a tower, a beacon with a sign labelling which building it will be. etc. Draw a class plan of how the houses should be laid out in the chosen spot – use a block, beacon to mark spaces for different buildings.

5. Allocate buildings from the list to different people to build.

Reading

6.3 Analysing writers' use of organisation, structure, layout and presentation

- explore the range of different ways writers use layout, form and presentation in a variety of texts
- explore the variety and range of ways the content of texts can be organised and structured

7.1 Generating ideas, planning and drafting

- develop different ways of generating, organising and shaping ideas, and choose from a range of planning formats

PREPARATION FOR INSTRUCTIVE WRITING (20 mins)

Short class discussion

1. Are all members of the group equally knowledgeable about building? If not, who will instruct those people? Written or verbal instructions? What is the best way for people to learn about Minecraft?

Reading task

2. Review existing guides on Internet and YouTube – use Learning Platform site with links to some key Minecraft guide sites – discuss pros and cons. Make notes to use as a basis for homework.

HOMEWORK – INSTRUCTIVE/INFORMATIVE WRITING

Either produce a short written guide, a short audio guide or a short video guide instructing the people who are unsure/ignorant about Minecraft, how to build their building in the next lesson. Make sure to use good connectives – see page.....in guide for examples.

Type your guide onto the Learning Platform blog or upload your audio or video guide to Minecraft Intervention site on Learning Platform.

Those who don't know about Minecraft will write a short brief describing how they think their building should look and what they think they will need to know about Minecraft in order to build it. Type onto Minecraft blog.

Lesson 2

FIRST BUILDING SESSION

Review of guides produced for homework

1. Students log onto Learning Platform – Minecraft site - give some time for the guides to be read/watched/listened to. Students should use 'reply' on blog to give some feedback on how helpful or not, they were. For audio/video guides, use discussion forum. Compare with the brief and the requests written by Minecraft novices. **15 mins**

2. Log on to MINECRAFT. Each person or group goes to chosen spot/environment and agrees on a space – builds their allocated building using the materials decided upon. **Give 20 mins for this.**

IF TIME:

3. Everyone explores the buildings and people are allocated somewhere to live. Review/discuss the initial build – what is good or bad? What needs changing? Was it a good place to build? Were the buildings appropriate to the people in the group?

HOMEWORK – Write your review of the initial build, on the blog, as discussed in the lesson. What works well? What needs to change and why? What else is needed and why? Who should be responsible for making the changes?

Finish your review with a short plan for the next lesson, in terms of updating your Minecraft village – don't forget to use appropriate connectives in your instructions.

Lesson 3

SECOND BUILDING SESSION

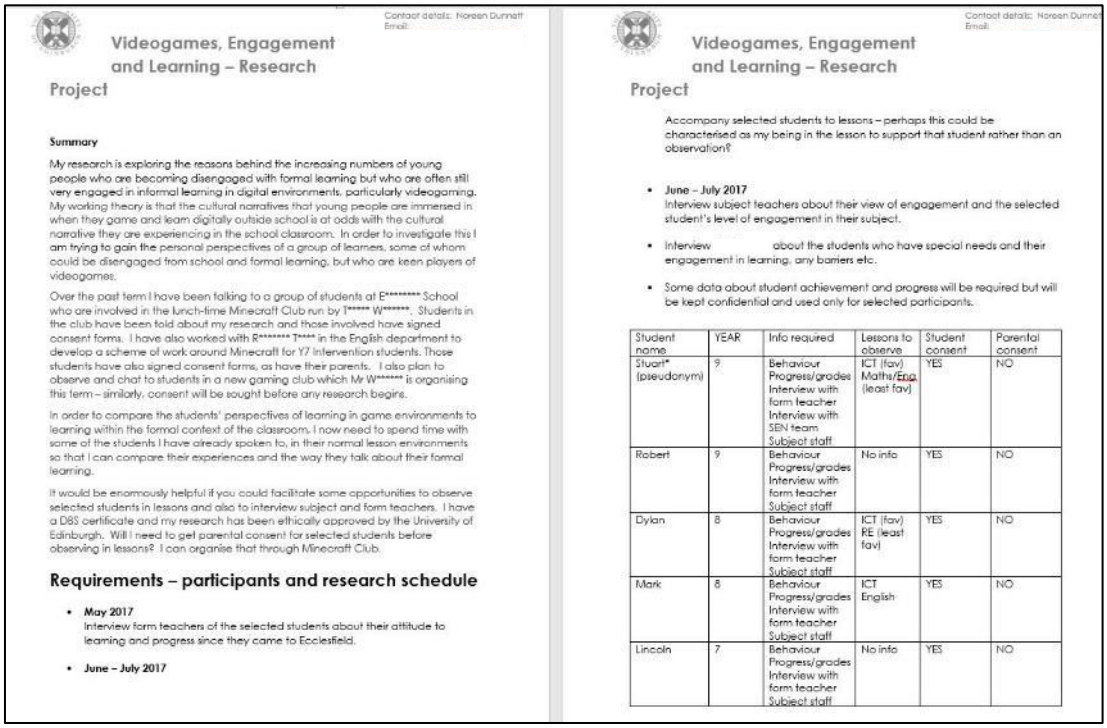
Read and comment on blog entries completed for homework. How well written are they? How clear are they in terms of understanding? Is the plan a good one?

Based on the blog entry reviews group now change or add to the buildings already created – allocate builders to different tasks.

DISCUSSION

Now the initial buildings are in place, is the village secure from animals or attackers? Who in your group can help with this and how? (soldier?)
Does it have enough basic supplies? Who in your group can help with this and how? (farmer?)
What will people do, day-to-day in your village?

Appendix 9 Senior teacher information sheet



Contact details: Noreen Dunnett
Email:

Videogames, Engagement and Learning – Research Project

Summary

My research is exploring the reasons behind the increasing numbers of young people who are becoming disengaged with formal learning but who are often still very engaged in informal learning in digital environments, particularly videogaming. My working theory is that the cultural narratives that young people are immersed in when they game and learn digitally outside school is at odds with the cultural narrative they are experiencing in the school classroom. In order to investigate this I am trying to gain the personal perspectives of a group of learners, some of whom could be disengaged from school and formal learning, but who are keen players of videogames.

Over the past term I have been talking to a group of students at E******** School who are involved in the lunch-time Minecraft Club run by T***** W******. Students in the club have been told about my research and those involved have signed consent forms. I have also worked with R******* T**** in the English department to develop a scheme of work around Minecraft for Y7 intervention students. Those students have also signed consent forms, as have their parents. I also plan to observe and chat to students in a new gaming club which Mr W******* is organising this term – similarly, consent will be sought before any research begins.

In order to compare the students' perspectives of learning in game environments to learning within the formal context of the classroom, I now need to spend time with some of the students I have already spoken to, in their normal lesson environments so that I can compare their experiences and the way they talk about their formal learning.

It would be enormously helpful if you could facilitate some opportunities to observe selected students in lessons and also to interview subject and form teachers. I have a DBS certificate and my research has been ethically approved by the University of Edinburgh. Will I need to get parental consent for selected students before observing in lessons? I can organise that through Minecraft Club.

Requirements – participants and research schedule

- **May 2017**
  Interview form teachers of the selected students about their attitude to learning and progress since they came to Ecclesfield.
- **June – July 2017**

Contact details: Noreen Dunnett
Email:

Videogames, Engagement and Learning – Research Project

Accompany selected students to lessons – perhaps this could be characterised as my being in the lesson to support that student rather than an observation?

- **June – July 2017**
  Interview subject teachers about their view of engagement and the selected student's level of engagement in their subject.
- Interview about the students who have special needs and their engagement in learning, any barriers etc.
- Some data about student achievement and progress will be required but will be kept confidential and used only for selected participants.

Student name	YEAR	Info required	Lessons to observe	Student consent	Parental consent
Stuart* (pseudonym)	9	Behaviour Progress/grades Interview with form teacher Interview with SEN team Subject staff	ICT (fav) Maths/Eng (least fav)	YES	NO
Robert	9	Behaviour Progress/grades Interview with form teacher Subject staff	No info	YES	NO
Dylan	8	Behaviour Progress/grades Interview with form teacher Subject staff	ICT (fav) RE (least fav)	YES	NO
Mark	8	Behaviour Progress/grades Interview with form teacher Subject staff	ICT English	YES	NO
Lincoln	7	Behaviour Progress/grades Interview with form teacher Subject staff	No info	YES	NO

English students – to be surveyed and interviewed first

Liam	7		Maths P.E	YES	YES
Charlie	7		German Science	YES	YES
Eliza	7			NO	NO
Josh	7		English Maths	NO	NO
Tim	7			NO	NO
Rachel	7			NO	NO

Appendix 10 Teacher interview questions

Introductory comments

The purpose of this interview is to ask you to reflect on your own views of engagement and disengagement in learning, particularly in the classroom environment and to describe those views to me. At the end of the interview I hope that we will have clarified those terms so that you feel able to nominate 3-5 students who play games and whom you consider disengaged from learning and/or school. Please include at least one Year 7, 8 and 9 student and a mix of gender and ethnicity would be nice! You may also ask any questions you have.

I will be recording the interview to help me remember what is said, is that okay?

Can I check that you have read the information sheet and signed the consent form I provided prior to the interview? Please could I have the consent form now?

Initial questions to put interviewee at ease

Could you tell me how long you have been a teacher?

What motivated you to become a teacher?

What do you enjoy the most about your job?

Do you play videogames?

MAIN INTERVIEW

1. Could you tell me about a time when you were personally involved in a learning activity (it doesn't have to be formal or academic learning) which you found highly engaging and absorbing and another time when you were not engaged at all?

2. *Can I ask you to watch this video excerpt of a lesson (**Time stamp: 21.36** to end) and comment on what you think is happening in terms of engagement in learning?*

http://link.brightcove.com/services/player/bcpid940636289001?bckey=AQ~~,AAAA2uzqQrE~,6OG0BmXJ4lLiPBlrslprnJtmkHdesQfW&bctid=946658354001

3. Can you describe one of your lessons, where students were highly engaged in a learning activity?

4. Could you describe one of your lessons, where students were disengaged from a learning activity?

5. Can you describe some of the things you regard as barriers to student engagement in the classroom?

Appendix 11 Interview transcripts

Please follow the link from the QR code for full transcripts, as indexed below. References from the body of the thesis are highlighted in each transcript.

a. Student field interviews – transcript
b. Home-based audio recording transcripts
c. English Intervention Student Interview transcripts
d. Teacher interview (complete versions) transcripts

Teacher Interview Extracts (start next page)

Ruth – English teacher – Interview 1 11th March, 2017

BEGINNING OF INTERVIEW EXTRACTED (for brevity)

ND: So you got a real insight from your point of view about what kind of activities are engaging or not (mmhm yeah). So could you just describe a lesson maybe recently where you felt really happy that you'd provided something that's been very engaging and you've had lots of evidence that the activity's been engaging - can you describe something

RUTH: I think that the most engaging lesson that I've done recently has been one that had kind of had several learning zones in it so the first part of it we were making newspaper articles about 'em a crime that had taken place in school we had this on-going kind of em don't know what you describe it as like a school rumour a ghost that haunts the English corridors and that's been going on for years and years and they tell the story in Drama and everything so obviously before they come to the lesson they've already heard about this rumour and then they come to English and they hear more about the rumour so we did a little discussion about what they know about that and then they em did some guided constructive discussions about they've heard and writing the rumours down and then they watched a video that was a news report that had been made by the department pretending to be journalists that they then used in the video so obviously they'd seen teachers that they'd seen before and were like 'oh this is interesting' and then it's just em they moved on through to picking apart a newspaper article that they'd previously read and were volunteering ideas to put headlines in and stuff and pretending to be journalists and kind of role playing the role of writing journalistically and em then doing video to record themselves reading, as a journalist, through their newspaper report and reflecting on what they'd done using peer assessment through the videos, so there was a little bit of ICT, some discussion, some humorous IT use from the department that had obviously all gone into that as well em yeah but engagement was really high and we produced a lot of really interesting articles because of the lessons

ND: Sounds like pace there, variety, yeah activity lots of activity

RUTH: Mmhm and humour as well I think that's really important for engagement em quite a lot of teachers aren't funny unfortunately (laughter) it's true we get boring sometimes, it's alright, it's okay (more laughter) we need to reflect on that…

ND: This will be a hard question can you are you willing to share with me a time where you've felt that maybe you've provided a lesson where you've thought well actually that didn't really work it wasn't really engaging and why you think that was?

RUTH: I think I'm currently in the unfortunate cycle of providing really disengaging lessons to my Year 11s at the moment because we're trying to prepare them for their exams. [right] I've never taught the syllabus before so I'm not wholly confident of everything that I'm delivering in the first place em and I think the challenge is making sure that we're delivering accurate content and also making that engaging at the same time I think striking a

balance between the two is quite difficult em that's not to say that all of it is disengaging cos it's just content driven em because we do do some drama em but..I do feel sorry for my Year 11s because they are pretty disengaged and I think it's because it's repetitive use of writing over and over and over again same things same structures repetition constantly and that's boring for them so…

ND: What do you think the biggest barriers to engagement are, in the classroom at the minute?

RUTH: Hmm that's a really that's really difficult question

ND: Cos it was really difficult when I was teaching what do you think, is you know, making it hard for teachers to make engaging lessons?

RUTH: I think some of it is to do with context of the school that we're in and some of it is to do with the world that we live in now as well I think with regards to the context of the…classroom the engagement problem comes from it's difficult [10.23] to provide thirty kids with access to IT facilities in such a massive school (10.23) em so when you want to give them like multimedia lessons you can't really do anything about it cos you haven't got the resources to hand so that's a problem em which means that engagement that you might get in ICT for using Cahoot quizzes for example you can't really do in an English classroom which is a shame em we do have access obviously to some iPads but with them being used more regularly now for example some staff are doing readers for exams it's quite hard to get them booked out for you em we have laptops but they're ancient so don't have the tech that you actually need so that's one problem and that stops them being engaged and I think another thing is actually walking around school they eh I find that kids are really exhausted these days from walking around and being given all this knowledge and its because of the curriculum being really complex (yeah) these days they're taking a lot more now and they're tired now because of it so that's a challenge and I think the context of the area we're from is a challenge we have a lot of white, working class kids who aren't really interested in making progress in the first place because they don't really aspire to be anything more than an engineer and because of that I think engagement in lessons is…. Is usually not particularly high anyway because they don't really care because they know that you don't have to work hard to get to where they wanna go so aspiration is a challenge as well um and then…lastly I'd probably blame a little bit of social media the Internet just changes everything

ND: So if you were looking at a lesson of your own or somebody else's just observing it how, what, if I was asking you to point out the disengagement what would you expect them to be doing, how would you spot them, how would you pick out the ones?

RUTH: Err I think it depends on the pace of the lesson - an engaged person so someone who's engaged will either be talking to someone about the thing that you're studying or they'll be writing an answer to the thing they'll be studying or creating something that's linking to the thing we're doing I think that someone is disengaged is looking around, not paying attention, can't

answer a question that you ask them directly em, can't think deeply about things as well if I'm, there's a lot of surface responses to questions where I go be able to answer what you've been talking about in the last few minutes (yeah) not the last two days em ……chatting, noisiness, bad behaviour..

ND: What about very quiet people that are not (mmhmm) badly behaved necessarily

RUTH: So they're the ones who, the very quiet ones who are disengaged are the ones that usually sit with one elbow on , and the other elbow propping them up they're a triangle and they just sit and they stare at you for about 20 minutes and you ask them a question and in return to the same thing em before …(laughs) proppers we call them em but I think..

ND: Em because I find generally if I ask a teacher just off the top of the bat tell me who's disengaging they refer all the badly behaved children to me (mmhmm) and that's not necessarily the case, often the badly behaved children are actually very engaged it's because they're being too loud about their engagement (laughter) em so I'm very interested that you recognise that it could take a different form, it could be switching off rather than being badly behaved

RUTH: See I find the badly behaved ones aren't disengaged (no exactly) the badly behaved ones tend to be badly behaved because they can't understand what it is you are talking about so they act because they're like hey pay me attention show me how to do something (yep, yep)

ND: They think they want to be engaged

RUTH: I think the silent ones are the sneaky ones aren't them they're like I'm just gonna sit here and just go to my next lesson and not really be bothered. It is quite challenging actually getting them involved but I think part of it comes from, as a teacher being consciously aware of what your classroom looks like (yeah) and then giving them things to do that maybe aren't part of your subject and 'Can you hand the books out please' or here's some merits I'm going to ask you a question today and

ND: That's why I asked you the question about your own engagement because I was disengaged and my disengagement I was never badly behaved I just wasn't there you know I do the as you say surface questions but I was just completely switched off and that wasn't recognised you know that I no-one would have said that I was a disengaged student, but I was

RUTH: It is hard to look under the surface isn't it

ND: Yeah because I was like you were saying it was just stuff you know it's got a bit better since you know I'm a lot older than you it was very much transmission learning it was very much the teacher you are the empty vessel, fill up you knowledge sort of thing there was no sense that they had any kind of duty to make it engaging or anything it was your duty to sit there (yeah, yeah) and listen and I didn't find that particularly engaging so..

RUTH: We do a lot of group work now as well to make sure people are engaged and I think the challenge comes from, obviously we're a massive school so you set your expectations and elsewhere in the school the expectations slip and then they start bringing it back in your classroom and then it's not working so group work suddenly becomes this kind of doss (yes) where they're not really doing what they're supposed to be doing but obviously the sign that kids are more engaged than they would have been if we'd not been talking so it's hard stuff for staff to tackle

ND: I mean that's what my research is about really its about its about saying when kids are in informal situations learning they're they're not always engaged but they're they learn in a different way it's much more social, it's much more group oriented you know quite often I'm not saying that your group works like this quite often we pay lip service in schools to group work but the kids know it doesn't count [yes] because they're going to be assessed individually whereas if you are learning a game together you know, it does count (mmhmm) because you know it doesn't matter whether you learnt it from someone else who was sitting next to you or that person played that bit of the game for you or…you're still getting to the goal aren't you and you're still

RUTH: …you know I feel bad because I've just thought about those booklets and thinking about the booklets I've done at least two moments where they've played the game together and then they've gone on to be assessed by themselves and I feel like I could have probably have gamified that more towards the groupwork sessions than actually some of the individual ones.

ND: Yeah well you're not encouraged to do [it's hard) that though because the assessment regime doesn't encourage you to do that and it's actually very tricky as you say to assess people as a group and I, like you, I had to consciously build that in and give credit for working as a group member, you know…rewarding that you know

RUTH: Previously when speaking and listening in English used to be actually assessed for them being able to talk as part of the group and have group speaking and that kind of stuff and now as part of your GCSE you need to do it but it counts for nothing, you get no marks for it (no, no) so obviously schools are now at the point where like well we don't really care let's just assess the individual piece.. It's a nightmare …

ND: they shame innit, because that kid is sitting there saying, 'so what do you think…' should be rewarded they were doing something which was you know facilitating that group discussion that was much more valuable than the person who talked the whole time, didn't let anyone else talk..

RUTH: I think that's the problem with education generally (yeah) it's delivering all of this content-based knowledge and you don't really have the chance at this point to give them the life skills

ND: Exactly you don't work as individuals you go out for a job you work in a team with other people, you're collaborating you don't do things on your own do you and it's a really hard lesson to learn you know. I didn't find it very

easy to work in a team no (I had literally no idea) teachers have a lot of autonomy and then I moved out of teaching and I went into an e-learning and design company where everything was in teams and I was a link in a chain and in a project I never had total control over something so it would be the designer, the programmer and I would write the content. It drove me round the bend….(No I totally understand) I didn't like it, I hated it and I couldn't make a move before the other person did it and initially all I saw were the negatives I didn't see any positives and then eventually as I started I realised that these other people, we had these quick meetings where we'd all get together and that really good ideas for my job were coming from the programmers or the designers or you know they would say things [18.35] like 'so what if you did it like this…' and I'd think 'bloody ell' you know and I started valuing the other people and seeing that the sum of you all is better than you on your own and that's what you need to learn

REST OF INTERVIEW REMOVED

RUTH Interview 2 - 2nd May, 2017

ND: How were the Y7 Intervention students selected for this intervention and why

Ruth: So the last assessment that they did obviously sprung up some data and we organised the data in terms of who was struggling the most getting marks for structure (

ND: Right

Ruth: So we tried to organise em a module where they could talk about structuring pieces of writing basically, things like discourse markers, em so we picked a mixed cohoRuth: of Pupil Premium, sorry disadvantaged is what we call it

ND: (yeah, yeah)

[em and

ND:(….)

yeah a range of girls and boys in groups as well and just then basically picked the lowest 40

ND: Right, so what were you hoping they would gain from the intervention (what were you hoping they will be able to do now that they couldn't do before)?

Ruth: By the time the end of the cohort they should now be able to use paragraphs, use discourse markers in their writing and also organise their actual thoughts and words in a piece of writing for effect, as well

ND: So looking at it now, now that you've come to the end of it, how do you feel about the amount of time allocated for the intervention, the number of lessons that were taught?

RUTH: I think the sessions would have benefited from being twice as long, with more time spent on them working on the Minecraft programme and more time spent on writing as well so we maybe like tried to fit too much of both things into a very short scheme of time and then it's not been as successful as it could have been so I would definitely give more time to a programme like that in the future

ND: So what were you thinking maybe for next time?

Ruth: I think as far as [week] programme it would probably really be a good idea if we give them the opportunity to explore the actual programme itself, have fun building stuff with each other and then creating something of consequence out of that as well cos I feel like some of the pieces of writing might have been a bit perfunctory and we could have got some better progress out of them for that.

ND: That was my feeling and I've got some ideas about…that I'll show you at the end about how you might make that a bit more integrated cos it did feel a little bit bolted on didn't it

Ruth: [yeah it did yeah]

[thought of a way of…so having said what we've said, you know, it had it's limitations, which activities do you feel (S can chip in if she wants) in the booklet do you think were the most valuable in terms of student engagement and reaching your learning objectives for the intervention?

Ruth: I think the first session was really good from the ones that I've seen so far in the book I think it's been really good for kids to have a look at actual Minecraft cos it was like the first session when we got to spend some time together looking at the world and talking about instructions so from my point as a structural point of the view them writing instructions was really good for that I think the reflection part of it was really helpful as well after they'd done their Skype interview because I think a lot of the kids actually thought about like the impact that technology can have on them in the classroom and understanding that English is not just limited to pieces of writing,, it's going further than that but as I say because of the limitations of time I feel like maybe they didn't get as much out of it as they could have done

ND: (mm)

[em, which is sad. S do you anything to add?

SH: The descriptive one - I think they actually really got into that and a lot of them went to do the blog and some got that they did genuinely really start getting some ideas and got into that and enjoyed that….yeah they seemed to really enjoy that, I'd say they were creating or looking at something and then describing it was really good.

Ruth: Cos they're actually creating something aren't they rather than just..

SH: Yeah and if they hadn't already created it they wanted to get up there or something they had already created and were proud of it and wanted to describe it so I think that one was..

ND: I hadn't thought about that, that you could have got them yeah to describe something..

SH: Because some of them were like 'oh miss can I just describe one I've made at home' and I was like 'yeah' the whole idea is that you are describing something so to be fair I don't really care what you're doing as long as you're describing something..

ND: And you usually have a lot more time for them to build things at home (yeah) much more elaborate so there is a lot more to describe

SH: So that was really beneficial I think because …spent a lot more time doing it because I think it did feel a bit rushed

Ruth:: Yeah

[especially some of the things I've got in mind. So is there anything you would do differently next time?

Ruth: Yes, I would organise for that scheme to be longer, em I would take the number of activities out and this is something we've had to address with the

Ruth: More holistic. I think we need to have a better management of all of the programmes in the background as well. I got a note from someone the other day in one of the folder things saying they couldn't open the camera's app, so they can't open the camera app on the iPad, they struggle sometimes to log into Minecraft, don't know how to get on blogs, like just full, full electronic training needs to be given because it was a pain in the butt..

PART OF INTERVIEW REMOVED HERE

ND: So do you, at the moment, do you think students have many opportunities in their English lessons to use the knowledge that they've gained outside the classroom, in terms of gaming, in terms of digital creation

Ruth: [mmm hmm)

[do they get a chance to use those things that they're very good at outside, in the classroom?

Ruth: I think that this is just coming from me as a Year 7 leader, this is [long pause] there's not enough, I think there's not enough time and we're under a lot of pressure from the assessment criteria and exams and data and all that kind of stuff, that puts pressure on us to [long pause) follow things in a more formal fashion, so lots of long form writing and … and practising and feeding back and going in a loop and looking at your marking erm so..we try, we really, really try and you try to build in opportunities for them to make posters or do something on computers like design CD covers. We have one week, one specific week built into a scheme of work for Media where they look at something to do with videogames. Even then, it's not really videogames, its looking at the depiction of characters rather than like actually going into games em I think (long pause) it's hard for us to try and balance between having something fun and engaging and something that's going to make them successful in their GCSEs because I think unfortunately the GCSEs we're about to do are not really, they don't really care about the softer skills (laughs) so it's hard to justify spending that time in that area but we're trying we do try s.

ND: Is there any way of maybe assessing or collecting information about what kids can do outside school and seeing if that is a way to [long pause] consider that in the classroom I think it might give kids more confidence to be able to show what they know

Ruth: (mmm)

[some of them know quite a lot it's not necessarily

Ruth: They do, em I think we could survey them and ask them how they're getting on and it's about processing that data afterwards, what do we do

with it. Em we're trying, considering at the start of next year more project-based learning so we'll be looking at a whole range of authors, getting them to produce pieces of work where they can show their parents what they've done outside the classroom and using technology and drawing and all of the creative things that I think within the realm of the classroom, particularly coming from Year 6 and having this hugely SPAG-focused learning and not really having much creativity is hard enough for when we get them in September to then teach them how to be actually read and write a creative story cos we can't do that, they can't think straight for themselves. So we have to make sure that in Year 7 they are prepared for the rest of their school career cos they're going to be asked to be creative (sounds of typing on a keyboard in background - S at another computer in room) and I think sometimes throwing technology at them as well as trying to get those basic skills sort is em a bit difficult to do ..so..

ND: Yeah I've got

ND ...mm she's a children's author and when I did when I was teaching I did one of her books and she was judging the children's writing competition as part of Sheffield Literary Festival and I met her then and she was absolutely lovely she talked to the kids she does a lot of work with kids and she's in this area but even so you know...

Ruth: Being able to have access to that conversation though really kind of cements for the kids that it's real world. I think that's one of the problems we've got right now with English is that it's not real world enough it's not... they don't seem to see the value of it which is a shame but..that kind of thing would be really helpful for the future so I'll keep that link...

ND: Yeah definitely do because I think you know having had a positive experience like that of Skype I think there's lots of other ways you can use Skype

Ruth: [Yeah definitely]

[getting people in to talk to And then the last question I was going to ask was quite a big question so have a think (Ruth laughs) so what do you think ..cos I'm particularly interested in digital culture and how that's...sort of sitting with school culture so what contribution do you think digital culture.you know what they're exposed to outside school.what contribution is that making to their engagement in learning in the classroom? at the moment..or do you not think it is?

Ruth: Emmm...ok..so when you say digital culture do you mean all involvement that they have with technology outside of school?

ND: Yeah just the whole world of online and digital culture that they live with in games and things (unintelligible)

Ruth: I think, I think the impact of that is a double-edged sword it has some really, really positive things about it it has some really negative things about it as well em..do negative first and then move to the positive..

ND: Yeah

[so I think (coughs, clears throat) having free access to all of that digital technology at home..without it being limited..em...poses some challenges with regards to [2] attention span..em.. like the ability to process information they don't learn the skills early enough on how to focus on something before they're given access to all of this stuff so...because they don't have that skill..they've got very little attention spans and then we're trying to teach them how to pay attention to something for an extended period of time..that in itself is a challenge ..em..you can see ..(unintelligble) ADHD and ADD is rising all the time and maybe that's got something to do with it as well erm.. social media has a te::rrible impact on the self esteem of some kids and makes some of them way more confident than they should be at their age which then causes maybe problems as well erm..but also from the positive point of view there's a sense of engagement in a global community so these kids can come into lessons and talk about things that are happening in Syria because they know, because they go on Facebook and read news stories about it so that interconnectedness em that is something never really experienced before em ..they care about the news, they care about politics because it's things they hear about every day and they want to understand more about the world they live in they just can't understand more than five minutes at a time of that material (laughs) ..so I think for teachers the impact..that has on the way we teach em.. we have to do a lot more quick paced, fast-firing material now that is very multimedia in the same way that kids experience the world now em well so we'll sit and do a paired activity and we'll be out of our seats and go round the room and then like..but very fast it's not sitting down and copying out of a book for 20 mins anymore em..unfortunately ..silence would be great (ND laughs) em I think the fact that they...they now can come to school and understand how to make a PowerPoint presentation without you having to spend three years teaching them how to do it which is a wonderful thing because it then means we now can faster set them on making PowerPoint presentations and talking to their audiences to be more confident verbally em..but then..on the other side that has an impact on them because they can't spell check and they don't know how to proof read grammar because it's always been typed out for them and they rely on that like...imagination is limited to the things they experience now as well.. em.. and with a lot of them not really watching TV or films any more because they play videogames and they'll only play one videogame cos children are obsessive about things that they do..all that they can imagine..em..is explosions and guns and shooting..or..oh no that's basically it (ND laughs loudly) it's very hard to get them to think about something creatively like I said cos Year 6s are not being taught how to be inspired so em...[1] there are lots of positives lots of negatives but ultimately I think we need to embrace that rather than being scared of it because...we're dinosaurs anyway (unintelligble)

ND: Have you heard of something called Maker Culture? A sort of big movement at the minute amongst technology people and all it - it does involve things like Minecraft and making videos and doing construction and..

do you get any impression that the kids are involved in that kind of thing here.. you know vast projects that they're doing with..

Ruth: I think..by the time they get here most of them have..no, sorry that's wrong, within the first three months because I used to ask my kids about this all the time within the first three months of them coming in Year 7 they'd stopped playing Minecraft in exchange for something that was slightly more destructive video game wise, they'd moved from Minecraft up to GTA and things like that which obviously if you're eleven is quite an intense leap into an 18 year old game em, so..once they're there there's no coming back from them

ND: Yeah

[there are..small pockets of kids that are involved in playing RPGs or constructing worlds with friends I think something that's really coming to the fore-front at the moment is not necessarily technology but em.. card games?

ND: Oooh?

[there seem to be a lot of kids now .cos obviously there's Cards against Humanity is sold on the internet and kids' sense of humour is now like five years more advanced than it should be but they're playing things like Cards against Humanity, this weird cat game that involves lots of craziness..so like..even though it's not really technology I think part of it is the game=making in the head is coming backwards it's like actually focusing on making games at school.by hand..bottle flipping is another form of technology..like how many times can you flip this bottle? and score a point making games for themselves so it's like..

26.18 ND: Yeah, yeah

[it's a weird thing to look at – I had a conversation this morning with my Year 7s and said do you prefer to read e-books or do you prefer to read real books and most of them said real books

[ND: Ahhh]

[even though they all have access to that technology, really interesting. I've forgotten what the question was, I just started talking about…

ND: Oh no, no it's really interesting there's something nice about the touch and smell you know the tactile thing with real books. I don't read real books so much because of my eye sight and on a Kindle I can make it the right size oooh dear it's terrible. Right stop talking about that now

RUTH: I hope it's all made sense

ND: Yes, thanks, it's been great

END OF INTERVIEW

Jackie – School S, Interview extract

ND: so that probably leads on quite nicely …can you describe, can you think of a lesson where *you think the students were *really highly engaged in it in something you set up, an activity that you set up

JACKIE: =I had a lovely lesson and it's a shame that you couldn't, because it was my year 8 group that I would have liked you to have come to see, I teach them twice a week and I've got you know, a *lovely relationship with them and yesterday, in fact the last couple of weeks I've tried to make the last couple of weeks, spend some time learning map skills just because their *knowledge of where places *are is not that great.. so yesterday em.. we were looking at em .flags we did it through *Wimbledon so taught a lesson about Wimbledon and what it's got to do with *Geography so the jewellery side of things and people coming from different countries and so we looked at a plan of em..er.. the *previous winners and the flag.. of the country that goes with the winner, but it didn't say the name of the country so I basically set it up and sa::id.. that I'd got a *theory that *boys were *better at identifying flags than *girls, obviously trying to be a bit *controversial

ND: [Yeah]

[and they just *lov:ed that straight away, so I set the room into two and I'd got like *girls working in groups at this side and *boys working in groups at that side and I'd said to them right you know just spend , you've got *three minutes to try and identify all the countries and then em [1] I'd pulled up the flag on the *board but used 'random student' - we tossed a coin and I said basically the first *boys name that comes up the boy gets to say where the flag comes from, he's got to do it's on his own basically on what he's just learnt from his friends, if he doesn't get it right it gets passed to a girl…see I've got some up there where I scored them and they *abso::lut:ely *loved it and it was just you know when it one of those nice moments when you think

ND: Yeah really getting into it

[oh they're really..into this..yeah

ND; Could you put your finger on what it was *about that activity

JACKIE: Competition

ND: Right, right

JACKIE: Pure competition

INTERRUPTION - another teacher comes in to talk to my interviewee. 14.57 - 15.15

Researcher: So, on the other hand then is there something you've tri:ed or something you've *done where you think they were actually very disengaged and what would you put that down to..

JACKIE: Errm I've had a lot of disengaged this year.. In fact if I can speak openly,

ND: [Yeah]

[this is obviously not about

ND: It's not to do with school,

[school..

ND: =it won't come back to the school

JACKIE: Em [1] since we've been taken over by ********* (name of academy chain) ... we are basically provided…with the lessons.. that come from sort of…the whole school community

ND: [I heard something about that]

[erm and ba::sically.. at the beginning of the year I got given all these lessons.. and I started to adapt them, as you *do, you know you make them your *own and you do it your *own way and then one of the directors came into the lesson and she was like 'oh yeah that was great' you know and there were, I'd got them like..em *again a bit of competition? I like I think there's s::o *much more *learning comes from competition. Maybe that's me because as I said earlier I'm quite competitive but I feel like I get it from *them,

ND: [yeah]

[and yeah the P.E side of things erm so I got them doing like little matching exerci::se and you know first table to get them a:ll *complete and you know, there's a bit of a pri::ze and I try to do a lot of *that and she said 'yeah lovely lesson but em where did you get it from?' and I said 'well I just adapted it' and she said no, no, no you *ca:n't do that, you've got to teach this GCSE in a *year, *yo:u haven't got the *ti:me, which is *fine, I *haven't got the time, when you look at all the marking that we're now expected to do and she said you just need to teach *it as you are *given *it and then when you kind of, when you're told that by a di:re:ctor you daren't deviate from it because then should your *results not be go:od and they say well you didn't do what we *gave

ND: (laughs) Yeah]

[you you're in a no-win *situation and so a lot of what I have taught this year has been a:wful,

ND: [Mm]

[*to::tally disengaging I've never…

Researcher: Can you give me an *example of something *particularly that you thought was awful..

JACKIE: Well just.. pretty much *every lesson when I and look at the lesson that's coming up *next , it could be like a slideshow that's basically forty odd slides long

ND: do you mean it's too passive there's..

JACKIE: Yeah , yeah it's *very, *very teacher reliant, I'm *exhau::sted at the end of it and they're bo:red out their minds

ND: [Right, right]

[cos *they're *sick of hearing me, I mean you saw the lesson that I did last week, it's very, very much …

ND: ..no they can't concentrate for that long

[no, it's information on flags.. and you know.. that's *not how I've *ever done anything and I've raised this a number of times like you know at the beginning of the year and just said 'can I make you aware that this is what I'm doing and I'm not comfortable *doing it and I want you to know, yeah I nearly cried when she said to me and she said you look really *upset about it and I said I *am I said, I'm gutted because basically you've just said to me that you're taking away from me the very thing that

ND: [yeah your creativity]

[I teach for, creativity, yeah and this *we::ek where I thought right we're done that I'm gonna do me own thing, *I think that they need to do the map skills it's been wonderful because I'm like this is *mine, this is *my lesson I'm teaching, mine so like = the lesson you saw..

ND: =all you're actually making a judgement about the kids in front of you

JACKIE: Yeah

[what they need and

JACKIE: Yeah, yeah

[if you're not after 13 years

JACKIE: [It's wrong, innit yeah]

[…that professional judgement to make .. Then it's a shame

JACKIE: And fair enough with the Key Stage *3, yeah they're not as em what's the word, *that's not as prescriptive in that we've gotta do what they say *but because of all of the other pressures I physically *cannot manage to plan the lessons myself ….

ND: yeah, innovate much

[no…I just d:o *not have the *time I start work *every morning at… I'm *never here any later than 7.00 if it's after 7.00 I consider myself to be late there's a time earlier in the year when I was coming in like for 6 o'clock I *never leave

the building before seven at night and I *have *not got time to plan.. lessons because I've got

ND: [and that's [ ] isn't it?

so much GCSE content yeah.. which today while I've been out I've been planning a lesson I'm just .. oh I'm really enjoying this because it's just *that is *a:lways the thing where I felt that my strengths were

ND: [Yeah]

[were planning the lessons that were engaging… it is like I was saying the other day, em.[1] that I feel like I mean we've got this behaviour system and its *great, I'm not sure *you were *there when I was saying it….

Researcher: Yeah I think I was

[about the..yeah..it's gre::at.. but I think the thing that you *lo:se with it is the building relationships with students because its almost like you don't have *to

ND: [Mm]

because rea- the way you *built relationships with students was... individualising it.. for *them.. and now it's a flat, it's a blanket if *that student, if *any student does that that's a *tick….

ND: [Mm I noticed that]

[…whereas in the past, you, you worked with the students that you knew if you *did that with them you'd get them on *board because you didn't have the back-up of the system so now you. gone is getting any of the students on *board with you because the *system doesn't allow you to do that. Does that make sense….

ND: It abso::lutely makes sense

JACKIE: I used to think that the thing that made me *successful was because I *did? manage with the challenging students because I built the relationships

ND: yep because that's how you managed the class

JACKIE: [Yeah]

[and having a relationship

JACKIE: Yeah and having a bit of banter with them

ND: [Yep]

[and em and make a joke of daft things and.. then…

ND: ..and not pick on every tiny little thing because sometimes it's better to just =let it ride…

JACKIE:=*better to just let it ride, that's it but we're to::ld you don't let it *ride, you *deal with it and we would be pulled down for…you know I've had people in my class who said you need to have more consequences there

ND: So what you know then perception of management is about what your role actually *is then, if it isn't.. input into.. the lesson or..

JACKIE: It's marking *books? (laughs)

ND: You could probably get TAs to do that, couldn't you

JACKIE: =Giving feedback to students through books I =honestly feel like I do

ND: =You're giving them, if you're giving all the materials to teachers then you're ba- anyone could do it

JACKIE: Yeah, I said this

ND: [Right]

[when I was told I said well basically I said I feel like I'm going to be a *puppet then next year

ND: =[yeah]

[I'm going to stand at the front and I'm going to press a button and I'm going to read what's on there..and even worse *sti:ll we were given these booklets which I've basically said this year *no way I'm *not even using them its cost us a *fortune in photocopying, but the booklets, *whilst? really *useful as a *revision tool except *fu;ll, *full of loads of information we've got to give them out in the lessons as well em and basically.. that had *everything that was on the slides would be in the booklet and maybe just a little exam question every now and again?

ND: [right?]

[and so you'd go through the sli:des, like do the exam question in si:lence, right then here's the markscheme, mark it right let's have a look at some more slides, let's go through it and it just.

ND: Very text-based

JACKIE: [Yeah]

[so if you're not a person who learns in that way,

JACKIE: [Yeah]

[if you're an aural learner

JACKIE: [Yeah]

or a =visual learner

JACKIE: [=which *I::'m *not [] yeah]

[or a kinaesthetic learner]

JACKIE: Yeah, that's *it I have to be *doing something I know *meself.. so and I know like the *other members of the department S was**** here earlier we *all felt the same

ND: [Mm yeah]

[it's been like you know you open up a PowerPoint me heart sinks, it's forty odd slides long, I think oh (sighs)

END of EXTRACT

TOM – Science Teacher, Interview extract, School B, 2016

ND: And what do you put that engagement down to? What would you attribute that engagement to? The way you did that...

HH: I think yes, I think sometimes some lessons because I think my downside is I control lessons sometimes too much and I'm stopping and starting and stopping and starting whereas that lesson I didn't it was just there you go off you go which is what you said that the beginning of this discussion really and they took it

Tom: Mine's other end of the scale in terms of students...

I have Year 7s twice yesterday so in the morning we had the theory of acid rain in the afternoon I had them period 4 and I just had on the board I would like you to design an experiment that proves acid rain damages plants, buildings and animals so we had a bit of discussion about how they could do it then got into pairs and they came out to this area here where they found some plants, some rock samples and some snail shells and they were running around finding them and in their pairs they came up with the idea that they needed to come up with two identical specimens and then they came back up and we used a freezer bag with petri dish and they set up a controlled experiment with some droplets of water first a pure water and then an experiment to test with some droplets of acid rain a bottle of acid rain that they dropped in in their pairs they had identical samples we've left them for a week and we're going to come back a week later and see what the effect is (yeah) they came up with the ideas they were sort of saying to each other well I've got this rock or this rock yeah but that's not fair because that's a different rock to that one and one of them got a snail shell that was bigger than another and said we can't use these we need to go and find another one because they're different sizes and it got them to come up with that idea

ND: You both seem to be saying a kind of degree of autonomy is highly desirable HH: [yeah absolutely]

[what we used to call discovery learning

Tom: Absolutely

HH: [but you can't start with that can you)

[well I'm not going to say all of them got it

HH: [you've got to teach them to get…]

[and quite a few of them really struggled the idea of them having a control took quite a bit of getting to at the start of the lesson cos they would happily all have said 'plant' and pour acid on it. (everyone laughs) was where we started

(prolonged laughter HH)

[which is not a bad starting place

ND: Trial and error then?

and then I'm outside running around with A***** A**** V******* who made me howl cos 'Sir, D*****'s chasing that duck'. 'He's a blackbird A*****, I'll go and sort him out

ND: And then just to finish do you think you could describe to me and this is really asking you to do - describe one of your lessons where the students were disengaged I know I'm asking you to do something that's a bit painful to do

Tom: I hate going through tests for me, we do it every single exam we do we'll give it em back and use the green pens and we do the marking improvement and its such an arduous task because they're not engaged with it they don't want to see where they've gone wrong they want to see the success so if they've done well they're happy and they want to put it to one side and forget about it if they done badly you're rubbing their faces in it and we see it as kind of a constructive tool to show them where they've gone wrong but it's a one-off test

ND: But kids can take failure they fail over and over in games and it doesn't bother them so its not that they can't take failure is it or is it something to do with the way..

Tom: I just find them hard work its hard work to engage students on a, on a feedback style when its,

ND: [so maybe it's about the way you feedback..]

[cos it's so black or white with what we're feeding back on. Right you put this it was wrong this is what you should have put I don't think they learn anything by writing it down in green pen

ND: And they can't apply it immediately as you could in a game so if you make a mistake you get immediate bit of feedback in visual or aural form and then you do the right thing straight after whereas the two things are divided from one another

END OF EXTRACT

Norman: Robert's form tutor, interview extract, November 2017

NORMAN: Robert (pseudonym) doesn't like backing down, is my main memory. Erm, as his mentor. He doesn't like losing face. Erm, but I've had more conflict in year Eight than Year Nine. But even something as simple as, (1) standing by the stairs waiting to be dismissed, he'd quite like to test whether he could get away with say standing at the end of his row instead, or moving across to another row so he got out the door quicker. Little things like that, little pushing the boundaries where and when he felt he could try to get away with it. Er, (1) he also tended, I think, so with quite a high frequency of behavioural referrals especially in Year Nine, erm, (1) he tended to try and deflect those, as much as he could. So I'd have a conversation along the lines of "this has happened in English." "Ah well, it's all right because my parents are ringing up to complain about that because of this." "This has happened in Maths." "Oh yeah, but my mum says not to worry about that because that teacher doesn't know what he's doing and it was actually x and y's fault because they were winding me up." So you wound up with, by term or half term, about ten different behaviour referrals. All of which Robert had basically said "oh yeah, but, they're not my fault."

ND:[Mmm].

[Kind of thing. At which point they got picked up by head of house and it ended up on a report. And I think he had a conversation with Mr. W*** (headteacher) at one stage, because of the number of referrals. Erm, (1) they thought there was a bit of a, bit of a cutting off towards the back half of the year.

ND: Yeah. But apart from his behaviour problems, it…

NORMAN: [Mmm.]

[...did you, did you get on all right with him? What sort of things is he into, what's he interested in?

NORMAN: He…

ND: [Is your perception.]

[He's very keen on his music I think via his dad.

ND: Oh, okay.

NORMAN: Er, but not through school.

ND: [Mmm.]

[Through his dad I think is a DJ over the weekend as a bit of a hobby or whatever.

ND:[Yeah.]

[So Robert couldn't for example, he could play Smoke On The Water on guitar, in a very accomplished manner, but when you're talking to him about

different ways to try and get him engaged in school, maybe, being part of the Music department's productions etc.

ND: [Mmm.]

[Something he might be interested in. And basically, the feedback I got from [5:42 name of music teacher, inaudible] in Music was, he was not particularly interested in learning anything else, it was very much his own way and "I can play Smoke On The Water so this is what I play" rather than "this is a skill I have and I would like to learn more songs." so he really want...he wanted to really do it, but not to, (2) to almost rebel at the same time as doing it…

ND:[Mmm.]

[...if that makes sense.

ND: Yeah. Maybe it, maybe he associates home and he doesn't want it to be part of school.

NORMAN: Yeah.

ND: Do you know what I mean?

NORMAN: [Mmm.]

[It's nice to keep things to yourself, isn't it?

NORMAN: Yeah.

ND: Yeah.

NORMAN: Kept them separate. Erm, he has, he has a couple of friends in the form group, erm. I don't know how strong of a friendship group he's part of in lessons, erm, it never really occurred to, well...

ND: Does he talk about gaming? Or anything to do with programming computing?

NORMAN: No. Erm, he' definitely interested if you say "what are you going to do this weekend?" his first will be "ah, nothing, it's going to be great." He's actually going to do nothing. Like, ah, X-box, whatever it be. Erm, (1) it's definitely be I think something (2) I got the impression that he does it quite a lot but doesn't talk about it, he certainly didn't talk about it to the people he is friends with.

ND: Yeah. That's interesting. He was very eager to talk to me about it.

NORMAN: Yeah, I thought.

ND: I had a big conversation with him about it

NORMAN: Yeah. I think perhaps if I take a more of an interest in it.

ND: Yeah.

NORMAN: If I'd have come across as someone who was interested…

ND:

[Right.]

[...and he'd have seen…

ND: [Because I was upfront.]

[Yeah. You had more of a shared interest than he would have done.

ND: [Interesting.]

[I think perhaps he's tried to talk to other people about it and they've not been interested…
ND: [Yeah.]
[...and that's put him off a little bit. But I don't know.
ND: Yeah. I didn't realise that. [laughs] Yes, that would account for his reaction. He was very positive and very happy to talk to me about it.
NORMAN: Yeah?
ND: Yeah.
NORMAN: Whereas I'd be able to hold my own in that conversation for all of about two seconds.
ND: [laughs]
NORMAN: So I've tended not to bother, to be honest.
ND:[Yeah.]
[Erm, I think he (2) his parents kind of...
ND: Yeah. I was going to say what's the parental situation like?
NORMAN: Yeah. They struggle a lot I think. I mean, A***, his dad I spoke to a few times. Erm, and certainly wouldn't have been working against the idea that "ah, this isn't fair and you shouldn't worry about it" and those sort of incidents. I mean that's something that was (2) not discouraged at home. Erm, just that, "that's ridiculous, that's not fair." Erm…
ND: Oh, you mean they were supporting that attitude?
NORMAN: Yeah, yeah a little bit.
ND: Yeah. Challenging the school.
NORMAN: They probably challenged, they probably took Robert's side more conflicts than not, I would say. And they (1) I've got one really strong memory. I said to him "what are you doing over Easter?"
ND: [Mmm.]
["Ah. Going on holiday." Ah. Here's a chance to build up a rapport, have a conversation. "Where are you going?" "Just going to Skegness." "Yeah, dad's taking his burger van, from Skegness to Scotland for two weeks."
ND: Wow.
NORMAN: I was like "you must be excited." He was like "no. I'm driving around towing a burger van for two weeks."
ND: [Yeah.]
[I don't know. It's...
ND: [Not a holiday really.]
NORMAN: Yeah, yeah.
ND: Yeah. Dad was quite, dad was funny, because they got, they gave verbal permission for Robert to take part in this.
NORMAN: [Mmm.]
[Dad said "I'd like to know a bit more about it." And I thought "ah, that's interesting." So I've got...
NORMAN: [Mmm. Guarded.]

[Yeah.
NORMAN: That's that family spectrum. [? 9:15]
ND: And I had sensitive information, but you know what Robert's like. He hadn't, hadn't passed it on. So I'd given it to R**** to try again, to send the information. Because I'm, I'm assuming at the moment that I've still got parental permission here, so... [laughs]
NORMAN: I think he does respond to e-mails, A***
ND: Does he? Right, okay.
NORMAN: : I think she'll have his e-mail address
ND: Ah. She might just be able to double, double check before.
NORMAN: Yeah.
ND: Yeah. If I'm going to be watching him in lessons, I really need his parents' say so, yeah. So, but, from what you're saying, it sounds like he's not taking part in any of the extra-curricular activities at school. Much.
NORMAN: Not as far as I was aware on a regular basis.
ND: No. He was doing Minecraft up until he had a fall out with some of the people…
NORMAN: [Mmm.]
[...and now he hasn't been coming to that, so.
NORMAN: Mmm. Which wouldn't be, I don't imagine that would be the first time he'd had fallings out...
ND: [Yeah.]
[...through his school.
ND: Yeah. So he's probably not very involved in the extra-curricular?
NORMAN: No.
ND: So would you, I hate to use, throw this term about, but would you say sort of he qualifies as a fairly disengaged student as regards school life, lessons, that kind of thing?
NORMAN: I think that he sees school more as something he has to do than something he takes an active role in.
ND: Okay.
NORMAN: I think that would be fair.
ND: Yeah.
NORMAN: Yeah. I would say there's a reluctance with most school-based activities with Robert.
ND: Yeah.
NORMAN: And I'd say he gets in at eight thirty-nine and leaves at three oh one. Er…

END OF INTERVIEW

Dennis – Lincoln's form tutor – Interview extract, 9/11/17

BEGINNING OF INTERVIEW EXTRACTED

ND: So do you think that might be erm..a..contributing factor to whether kids are engaged or disengaged with *school not- maybe not just with specific lessons, but just with school?

DB: Certainly with out there, out in the corridors, out on the playing fields erm [2] it's nice-, I had a- a couple actually when- [1] on PGL together. A Year...9 and a Year 7 last year [1] they went away and they actually came back from this trip

ND: [Mmm]

[This school trip, and they'd claimed, oh we- we bonded, you know what I mean? We got on and

ND: [Mmm, yeah, right]

[I mean, they've not really spoke much to each other in form, but I could see that they were happy. Whether that's a part of the vertical mentoring system I don't know but they were happy to [1] that weren't a barrier, if you know what I mean, they already had some familiarity. So I would assume more out there..corridors, playing fields

ND: [Mmm]

[than lessons certainly]

ND: Yeah.

SECTION OF INTERVIEW REMOVED HERE

ND: [Yeah, yeah. Do you- how important do you think extra-curricular activities are to kids and their attitudes to learning and school?

DB: I th- I think it's really important. I think there's a big push from the school as well and erm [2] it's [1] I guess the idea is it's not the club itself, it's the engagement with school on another level. Seeing them teachers..outside of a classroom setting, seeing students of like-mind from different years, different classes, and getting involved in the school as a whole [1] and not just seeing the school as somewhere I come to Monday to Friday, periods 1 to 5 cause...the law says I have to you know what I mean? That's I think...erm, the key, the important point. If that's done by...whatever they're interested in then surely

ND: [Yeah]

[that's a good way into it. So yeah.]

REST OF INTERVIEW EXTRACTED – END OF INTERVIEW

Sylvie – Dylan's support worker, interview April 2017

SW: Uh initially (1) when he came he was still very immature. You know like most of them are. Uh he got a bit anxious about certain lessons and the noises, particular the noises and things.
ND: Oh. Which lessons?
SW: It was (1) it was lessons where we'd thought he'd done well but he wasn't actually doing as well as he thought he would (1) do.
ND: Oh.
SW: Um I've been his key worker since Year 7. Um and he came initially with ADHD. Since then he has been uh diagnosed with ASD and dyslexia.
ND: What--what's ASD?
SW: Uh Autistic Spectrum Disorder.
ND: Oh right interesting.
SW: So that often is linked...with ADHD. And also specific learning uh (1) difficulties also are linked with um you know special educational needs. [coughs] He (1) struggles with green uh whites, you know anything that isn't colour.
ND: Yeah, yeah.
SW: So anything he has green books, he has green overlay um in Year 7 he had a visual timetable goes to the standard one that other students get which he said it really helped him get around the building.

SECTION OF INTERVIEW REMOVED HERE
SW: [Laughs] Yeah he does I mean (1) he's (1) he's just a kid that he's (1) although he--he does fluster about things and he can panic but you don't-- it doesn't take much to win him back round (1) uh he doesn't like change. [laughs] But who does really? So if you look at his report, that's his last school report but that was in April.
ND: Mm.
SW: So you can see that he's making (1) less than expected progress in English uh none of these because that one has gone up and that one has gone up uh but I think it's just his basic understanding uh it's like if you look at that what I've written there and then what he's written.
ND: Mm.
SW: He will only put the minimal amount of work in.
ND: Yeah.
SW: But then when I ask him to read it back, he can't even read his work back sometimes. And that's what I feel we were letting him down because it's...
ND: Have you tried typing? Has he tried typing?
SW: Yeah he can try typing but...

ND: Yeah, yeah is that any better or?
SW: It's not one it's not if they have access to internet they can get distracted. It would be better for Dylan to work on the computer...
REST OF INTERVIEW EXTRACTED - **END OF INTERVIEW**

JT and ST – Teacher interview extract, School S, 2016

BEGINNING OF INTERVIEW REMOVED HERE

ND: Yeah so that kind of leads me on nicely saying could you just each describe to me a lesson where you think that you've got it right and the students have been highly engaged and what was it you did in that lesson that you highly engaged the students?

JT: I've got to say in History it's sex, death and toileting isn't it? If you phrase something in the right way and I don't just mean that that's got to be in Maths but there are three lynch pins in every subject that once you've get kids onto those they latch onto them and they like them like you'll do something you'll do a formula and the kids become comfortable with that so once you present that again they can add something else on if you don't get that underpart right the beginning bit that develops that relationship it doesn't work I think you can teach the most interesting dynamic, all-singing, all-dancing lesson and kids will be switched off if they either don't relate to you or they don't relate to the topic

ST: I think in a place like this it's more that the kids relate to you (..) with the type of kids we teach

ND: So what makes a lesson highly engaging isn't necessarily the content of the lesson it's the appro...

JT: It's the person it's how you deliver isn't it because you do we do the most History and Maths I've got to say in this school they're the driest subjects there are we have content overload and you have skills overload and if they lose a part of it they've no chance in the exam you've got to find a way to keep revisiting things and the ones who've got it not get bored but not leave others behind that need that for the exam and I think it's juggling in a lesson making sure you are bringing some on but not boring others. I don't think you can say I've had one lesson where its been totally successful for every child but what I would say is sometimes I've had a child that's not got something in one lesson and by sheer fluke in another lesson they've picked it up and I think that's how you show success it doesn't happen in every lesson I can have lessons where I think Jesus I shouldn't be teaching and then you have other lessons where you think yeah I think about 70% of them got that you're never going to engage 100% of them all of the time

ND: Are there particular things that do though in your experience disengage really disengage students things that you've done that...

JT: Writing long passages disengages but we have to do that for exams so I know that switches off so we now break it down that if they're going to do a long passage that's worth say 16 marks they do an introduction one lesson then they do a content lesson and they do a conclusion. Ours is writing because boys often can't write in any legible form even up to Year 11.... I don't know it's difficult to say I'm sure I could put a video on every lesson and if it was about Vietnam or about whatever the kids would be totally engaged whether they would learn anything for that and whether they would develop anything from that I'm not too sure because they would see any kind of video as being make believe when I showed them I showed them a video of the Battle of the Somme and one of the girls couldn't get over that that was real footage of war from the 1900s whereas I showed them a modern day clip of the Somme and they still thought that was real so I do... I could use videos every lesson but I don't think it gets them engaged in the right way, yeah they'd watch it and they'd be quiet, and does that show engagement?

REST OF INTERVIEW REMOVED

END OF INTERVIEW

Appendix 12 Cryptography Lesson Evaluation in OneNote

Lesson Overview

In this lesson we will use logic, and the previous lessons to escape our room.

Lesson Presentation	Open this presentation only if you struggle to view the board, otherwise, complete the starter given.

Lesson Objectives

Rate your ability to do these objectives at the start of the lesson and then see what progress you have made at the end of the lesson.

1. Click on box	2. Click layout	3. Click shading
	Layout	Shading

	Initial Steps	Towards	At	Beyond	Exceeding
Learning Objective	I can navigate between my area of OneNote and the Content Library	I can decipher a simple Morse Code key	I can decipher picture codes	I can decipher transposition ciphers	I can decipher Enigma code
Start					
End					

Task

Make your way to the content library. Press the green up arrow

5

and then content library

Content Library

Go to Room1.

Notes

You can't edit the content library You may take notes here

Room1	
Room2	
Room3	
Room4	
Room5	
Room6	
Room7	
Room8	

Appendix 13 Lesson transcript English Intervention

Teacher: Right some of these (referring to instructions students are writing) are really short and I think we really need to extend them so if you want to….

ND: Yeah inventory ..right i. n ..v, e, n. t.o.r.y

Student: Did it

Teacher: then you come in here... right can I have a look? ok so you press the three dots on the right-hand corner which will take you to the inventory. Ok so this is the kind of... guys can I just give you an example of a good sort of instruction here? (reads from a student booklet) 'You press the three dots on the bottom right corner which will take you to the inventory'. Brilliant, that's a nice clear instruction. So I know bottom right corner, three dots, press that, it will take me to the inventory. What do you think I need to write next?

Female student: How to move

Teacher: Well maybe what's in the inventory might be a good thing. What is inventory?

Student: Blocks ...

Teacher: right that's the kind of thing I probably need to know next so that might be another instruction. Now what does this inventory do? Like I don't know, I don't know what an inventory is, I don't know what it does, I know what one is but I don't know what this one does.

ND: Oooh very fancy (observing a building on student Minecraft screen)

Teacher: That's good. That's another good example.. so I press the arrows in the bottom left hand corner to move. Good example. thank you

ND: If you can't remember just try out your instructions as well see if they make sense

[well done. These are good - there are some nice clear instructions here. I feel like I'm going to be a whiz by the end of reading your booklets. Good lad - are you rewriting these out so that I can... so you're telling me where the buttons are to press then? Well done that's good.

ND: you could test them all on Olivia couldn't you? (Olivia is a student who has never played Minecraft before)

Teacher: We could yes

ND: …..and Miss H (who hasn't played Minecraft either)

Teacher: Maybe we should just sit here and like follow the, all those and see if they make sense?

Student: Are you in our world? (speaking to his partner. Students are working in pairs, sharing worlds on the local LAN)

Teacher: we could be the guinea pigs

Student: It's called moo…

ND: Ok, your world is called moo?

Teacher: moo? Whose is that one, is it yours?

Student: that's Dylan's and I'm in Dylan's world

ND: Do you think we do you think we need to tell people the difference between creative and survival mode

Male Student: Yeah

[... because they different aren't they?

Male student: Survival's like, you have to like..

ND: do you think we should say

[…..collect the blocks to be able to build it

Teacher: That might be a good thing to put down…

Male student: in creative you can just go on a block that you need to get to put down the block

Teacher: Right maybe you should write that down. That's quite helpful because... which one do you recommend to someone whose brand new? Creative then?

Male student: the first time I played I like..

Teacher: .. so that one might be a good one

Another student: ...If you go on a console you…..

Teacher: Mm that's a good one. Why don't you put that down as an instruction as well? That's quite a good one that, might be something you could write down

ND: (speaking to teacher) just recording some comments, they are good you see and I want to remember when I get home

Male Student: Why did you put 'Why?'?

Partner: because you said goodbye

ND: I play it on the PC

Female student: I need to go to bed

Female student2: Right shall we get the bed?

Female student 3: you've already got one

Teacher: yeah but is that an instruction where I didn't notice where you have to go? Do you have to go bed?

71 Charlie: Not necessarily but it it goes quicker if you do go to bed

72 Teacher: if you go to bed what goes quicker?

73 Student: ..night

74 Charlie:...the cycle as if you're actually sleeping

75 Teacher: Aaah that's a good instruction

76 Charlie: because in the original game when you want to sleep you're going
77 to go dream mode weren't you?

78 Teacher: so would that be worth writing down as an instruction? if it goes
79 dark the night time...

80 Charlie: go to your house and go to sleep…]

81 [...Get in your house and go to bed…

82 Charlie: so the monsters don't eat you

83 Teacher: Ok so that might be a good thing to write down like a little…..

84 Liam: It pretty much just skips the night

85 that's it I don't think my sh….

86 Teacher: Can I ask you maybe how many bullet points have we all done?
87 have we all managed to do about 6?

88 Female student: I've done 3

89 Student: I've done one two three four

90 Teacher: ok so maybe just have a go at doing a couple more=

91 =Charlie: I've
92 got five

93 =Student: I've got five
94 too

95 [and then we're going to have a look at the next page in our booklet ok
96 guys

97 Female student: Aww I wish we had Survival I could kill Tyler

98 Teacher: I'm sure we'll get onto that at some point

99 Male student: you can still do that

100 Charlie: yeah you can. That's encouraging…

101 Teacher: ... just to start maybe in creative mode I think that I feel like that's
102 enough for me

103 Charlie: it might teach them about defence

Teacher:.... thinking about it, full sentences, really clear instructions for someone who is literally never played this before in their life (talking to different student as she circulates the table - see pic)

ND: (talking to teacher) ....one of my students has done a whole farm where everything is in French

Teacher: aah that's nice, I like that

Student: (to partner) Tyler, move out the door.

Teacher: What else can you tell me about..

Student: it's raining I'm going to shut the door.

Teacher: So...have you explained how to build or anything like that I don't know

Charlie: Yeah by using bricks

Teacher: But what do you *do with the bricks, do you like what? Do you have to buy them ...or you like...

Charlie: By stacking bricks there's a cursor, that's a cross and you have to get that

Teacher: That's a nice explanation

[where you want to put it (the block) and then you tap the screen and it like presses

Teacher: ok. Alright that's a good description, let's get that down

Charlie: that's my fifth one (bullet point)

Liam: it's not going to stop raining

Charlie: you will if you go to bed.

Teacher: what would you tell Olivia…..

Charlie: you do the same thing cos…..

ND: Whenever you're doing it on a….

Charlie: you just hold

[whenever you start doing Minecraft you always have to

Teacher: ok did you manage to get one more done?

Student: Yeah

Teacher…. what were you asking me?

Student: if you hand in it is recommended that you….

Teacher:.... in creative mode is that the right way of putting it

Female student: I'm asleep

Charlie: no it's just creative

Female student: Leave my bed (reading from screen)

Male student: where am I?

Male student 2: Outside

CM: in the wall

Student; yeah you can

Teacher: alright then guys if you get that last one down can I ask you,

ND: Have you just spawned underground?

after you, again just put your right hands down again ok

Charlie: he's trapped in the wall

Male student: untrap me

Teacher: ok. Alright can we turn to the first page for me please guys. That's good and I've seen some really good instructions and a lot clearer than just saying 'you just press the inventory and you pile in' and I'm like……. Blah...those are a lot clearer. I've had a look at that and checked out how clear they are and I might even have a practice of some of them. Thank you, good boy. Alright, excellent. Turn to page 3 because..part of the... (laughter from teacher and class) Has it just come to life (referring to one of the iPads which wasn't working)

ND:[oh you've got it[

[part of your (unintelligible) part of this research, part of your, this intervention, you are going to write a guide or part of a guide on how to actually get on Minecraft and play it ok, and I think that this is what you will probably write on Friday in your block, on how to actually get on Minecraft - useful instructions on how to actually get around on it.

Someone has already created a guide, I imagine lots more than this online, but these are just a couple of examples of guides. If I read through this one here, this clear one here. Right I'm going to read it through with... with me I want you to think about what is good about it first and is there anything you would improve or are there things that you would change for... for... what's particularly strong on this guide and you guys being the experts on Minecraft apart from me and Olivia. So remember we're looking at this from a beginner's point of view, whether we think this is a good guide. You'll look at it as a.. would that have helped me... alright so I'll read through it with you. If you wanna read through with me. So the How-to-geek Guide to Minecraft. (reads from page) 'Minecraft is one of the best video games of all time although getting started with it can be a bit intimidating'. I'll say! What does intimidating mean? John?

Student: Scary?

Teacher: Good lad, well done. (continues to read aloud) ….let alone even understanding why it's so popular. In this edition of how to be an Explorer we're going to get started with the game or at least understand why your kids love it so much'. Who's this aimed, at this guide?

Charlie: parents?

Teacher: yeah, why

Charlie: cos like it says 'why your kids like…'

Teacher: yeah well done. So this is aimed at adults and parents isn't it, so it's not aimed at you guy, it's aimed at people more my age and older isn't it? Ok 'despite its simple appearance there is a whole lot going on in Minecraft. It can feel confusing but don't worry we've laid out a series of lessons that will take you from not knowing a single thing about the game to advanced gameplay. This includes creating custom maps building and game design structures as well as thriving in the difficult survival mode to get you playing the game as quickly as possible. After that will have theory lessons focused on optimising the game' and it just skips off the end then (referring to the extract running out at the end of the booklet page) Alright, what's good about this guide? Any ideas? What do you think, it's your personal opinion. I think there's some good bits in that little bit there - if you look at different areas that you can go to to find out different things but you can do... what's good about these guide? what do you….

Liam: it tells you all about the game

Teacher: what do you mean by, it tells you all about the game?

Liam: it tells you like meet the biomes... it's like so if you come across different biomes you will know what to find there and stuff

Teacher: Ah so the little... the different headings at the side are good because you can go into those headings and find out more information is that what you're suggesting there? ok that's good. what else is good?

Liam: it uses a lot of descriptive writing

Teacher: it does. What can you give me an example of….a descriptive word?

Student: Thriving

Teacher: Thriving, mmm ok where does it say that? Can you find it for me.

Student: it says 'as well as thriving in... '

Teacher: '...thriving when in the difficult survival mode'. What does thriving mean?

[2] Any ideas?

Student: I don't know

Teacher: go on

Student: Does it mean like wading through the magma

Teacher: Not far off actually. If I said 'the plants are thriving in these conditions' are they growing well or are they dying?

Various students: Dying

Dying

Teacher: Oh, if I said that 'humans are thriving on planet Earth', are we doing ok for ourselves?

Student 1: yeah

Student 2: yeah

Student 3: Yeah

Teacher: ok so we've got a different meaning then. Which one is it? Are we doing ok, are we doing really, really well for ourselves or is it that we are dying off?

Students: we're doing alright

Teacher: we're doing alright for ourselves, we're surviving, we're doing really really wel -l that's what thriving means.

ND: it's like surviving

Teacher: Yeah it is like surviving, so you can remember it like that can't you? Surviving but not just with, but like really, really surviving. Ok so what they're saying is that you can, you could thrive in the difficult survival mode so you can survive in the most difficult survival mode - it's a nice word to use isn't it? Anything else that is good about this guide?

ND: Think about the layout as well, is there anything about the way it's laid out that makes it easy to look, easy to navigate?

Charlie: Tt's got like a big heading like, to make it stand out

Teacher: It's a massive heading, a massive head line across the top hasn't it and it definitely stands out. What about the language? Did you understand the majority of what I read out to you? Did you understand it? Was there any words for somebody who's never come across Minecraft like myself that I wouldn't understand? Think about this one when you just said you said to me just 'meet the biomes of Minecraft'. What on earth is a biome? I don't know what one of those is.

Liam: It's like a jungle

Teacher: Ah ok but I don't know that, so are there any words in that lesson 1 getting started that I wouldn't understand for Minecraft?

Various students: yeah yeah

Teacher: Are there? Apart from that biomes one, that's in the side bit isn't it, in the menu, in that little bit that I read out, is there anything in there that I

didn't understand? Olivia you can answer this? Did you understand all of it that I said there?

Olivia: They could have like described more about what survival mode is

Teacher: They could, couldn't they? They could do yeah, that's good. They could have - giving more detail on what creative mode was and what survival mode. Do you think they might do that a bit later on?

Student: Probably

Teacher: yeah I think they might do that a bit later on I think, later on

Student: …like in exploring Minecraft

Teacher: yeah I reckon that's where they'll go into that. So do you think that is a successful introduction to Minecraft? Sort of what it's about and how to get started and things? Do you think it's good at that?

Students: Yeah

Teacher: ok alright, so when you write up yours, when you write up your guide to Minecraft on how to get started on it and what things, do you think you can steal some of these ideas for your own?

ND: You need to think about not having all the information on the first page for example because what does that do if you put everything on that front page down in those links, if you just put it all on one page what happens?

Teacher: what would happen if I… if you were because you were shouting about biomes, you can do this inventory, you can do this that and the other...

Student: It would be all squashed together

Teacher: It will be all squashed together..what else?

Student: It wouldn't explain what certain things are

Teacher: Right, definitely

ND: it would be confusing wouldn't it?

Teacher: Do you think I'd be able to understand how to get on it and just start

Student: No

[No definitely not, if you started talking all this stuff at me I wouldn't have a clue so what do we need in that first, first sort of guide - that first page about how to get on to Minecraft?

Student: ...Showing what to do

Teacher: yeah maybe some of the simple things like the moving around and how to actually physically get on to it and then move around that's the kind of thing I want, I want really really simple, so things like... oh somebody was

saying you can eat the food. Is that simple or is that getting a bit further on when you've been in it a little while do you think? Do you think it's quite simple, how to eat the food? Oh ok then, well maybe you're very advanced at this...

ND: in fact the tone of voice you know, I mean the way that person is talking to the adults. Is it very formal, is it very..

Student: it would be like

Teacher: In this guide here...

ND: how would you describe the way they're talking to the people

Student: It would be dead formal because they don't really know them so they will be telling them how to play it in a formal….

Teacher: ok but just let me read this out to you. Let me just read this bit out to you... ' The guide will help you get started with the game or at least find why your kids love it so much'. Is that very formal?

Student: No

[bell rings for the end of the lesson]

Teacher: It's quite chatty isn't it right? We're going to have to leave it there (noise and chatting as students pack away ready to move onto next lesson)

Right what do you need to do for Friday?

[various replies from students]

Can you bring your iPads to the end of this table…. I don't want anyone walking home with an iPad.

Student: whose is that phone? (it's my phone, which I have recorded the lesson on)

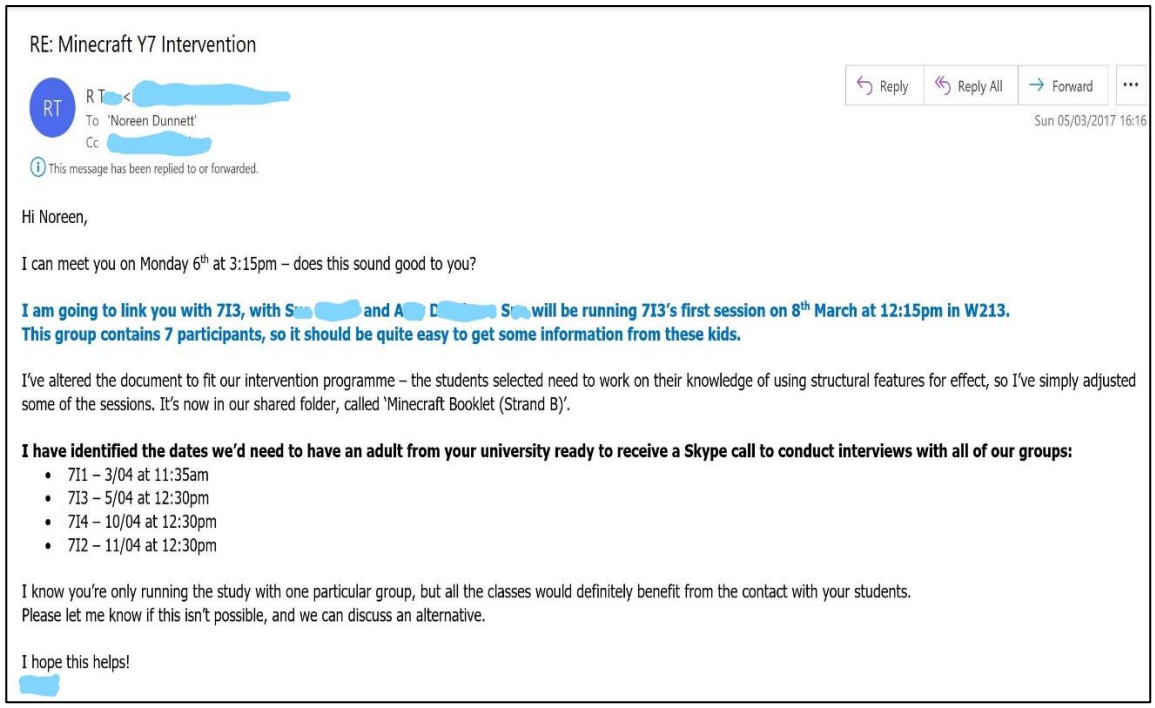
ND: Thank you very much guys, you've been great

Teacher: How did you get on in that session? (to students as they are leaving).

Student: It was brilliant

END OF TRANSCRIPT

Appendix 14 Email from organiser of English Minecraft Intervention lessons



RE: Minecraft Y7 Intervention

RT R T <[redacted]>
To 'Noreen Dunnett'
Cc [redacted]
This message has been replied to or forwarded.

Reply | Reply All | Forward | ...
Sun 05/03/2017 16:16

Hi Noreen,

I can meet you on Monday 6th at 3:15pm – does this sound good to you?

I am going to link you with 7I3, with S[redacted] and A[redacted] D[redacted] S[redacted] will be running 7I3's first session on 8th March at 12:15pm in W213.
This group contains 7 participants, so it should be quite easy to get some information from these kids.

I've altered the document to fit our intervention programme – the students selected need to work on their knowledge of using structural features for effect, so I've simply adjusted some of the sessions. It's now in our shared folder, called 'Minecraft Booklet (Strand B)'.

I have identified the dates we'd need to have an adult from your university ready to receive a Skype call to conduct interviews with all of our groups:

- 7I1 – 3/04 at 11:35am
- 7I3 – 5/04 at 12:30pm
- 7I4 – 10/04 at 12:30pm
- 7I2 – 11/04 at 12:30pm

I know you're only running the study with one particular group, but all the classes would definitely benefit from the contact with your students.
Please let me know if this isn't possible, and we can discuss an alternative.

I hope this helps!
[redacted]

END OF APPENDICES